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Engineering News-Record

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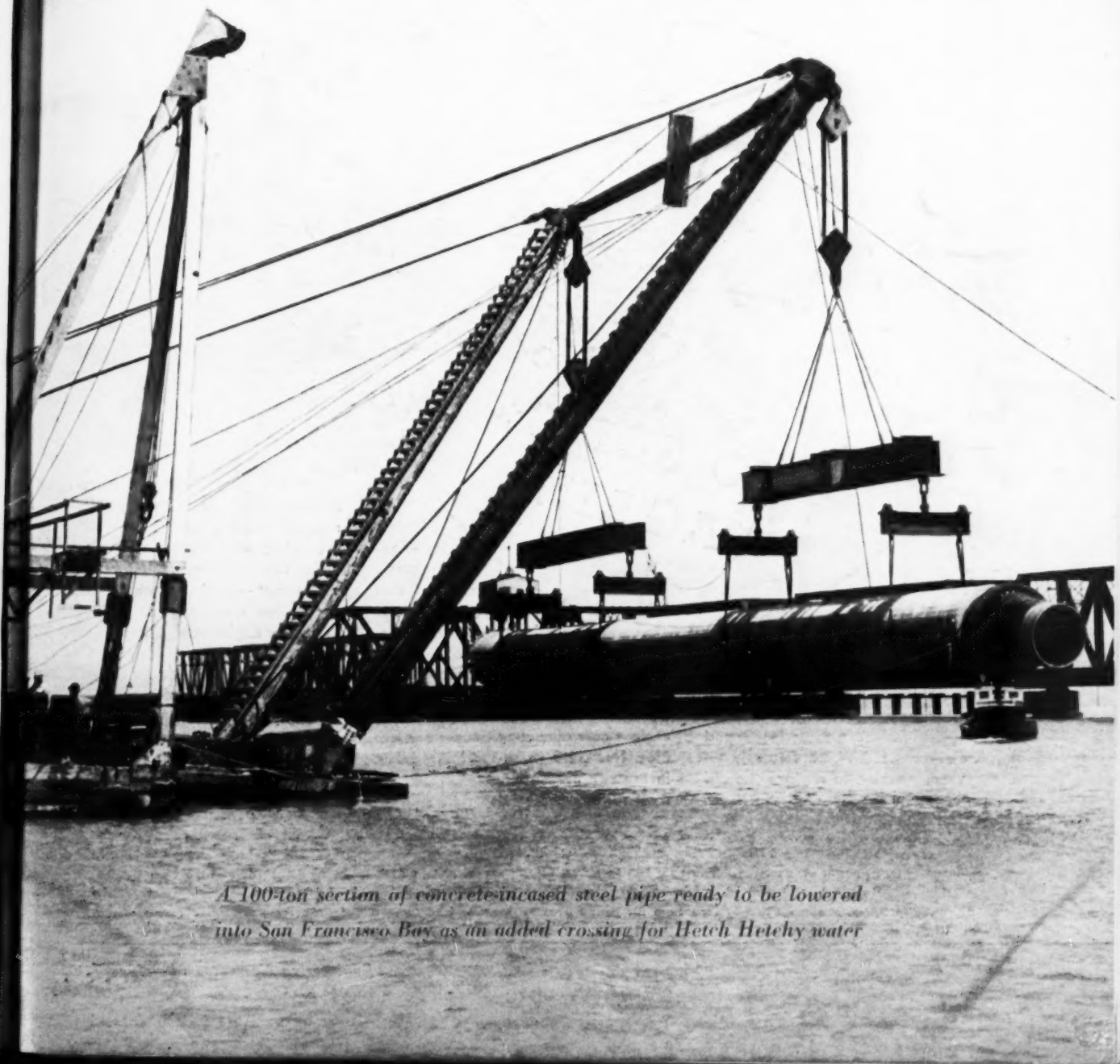

A 100-ton section of concrete-incased steel pipe ready to be lowered into San Francisco Bay as an added crossing for Hetch Hetchy water

Wrought iron often outlives its original assignment—even under the severe corrosive conditions attendant to salt water installations.

For 32 years this 10" galvanized wrought iron pipe had served as a fire line under Hoboken Piers No. 3 and No. 4 of the D. L. & W. R. R. Recently the engineers decided to replace the old lines with new ones located overhead.

But — examination revealed that the old line was in excellent condition and, therefore, it was reinstalled — thus saving the cost of new pipe.

Many other instances of wrought iron's long and economical life under various corrosive conditions are in our files. This data is an unfailing guide in the selection of the most suitable materials for resisting each type of corrosion. And, if you wish aid in analyzing corrosive conditions, our trained field and laboratory staffs are at your service.

Tell us the type and location of your equipment — tanks, smokestacks, refrigeration systems, plant piping, etc. Write our Engineering Service Department or our nearest Division Office, and by all means request a copy of the engineering report entitled "The Use of Wrought Iron in Salt Water Service."

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Is Efficiency a Liability?—I

IN ALL the record of these trying years few episodes have been more bewildering than the President's persistent endorsement of the fallacy that industrial efficiency breeds unemployment. The father of that notion surely can sell his wares; if his understanding of industrial history were equal to his influence over the Chief Executive he might be a powerful force for economic recovery.

Only recently the President restated his position in the course of an attack on the generally accepted principle that lower costs and prices enable more people to buy and thereby stimulate consumption and increase production and employment. He does not believe in that principle. He declares flatly that "reduction of costs of manufacture does not mean more purchasing power and more goods consumed. It means just the opposite." In support of this startling statement he cites the history of the 1929 to 1933 period as showing "that consumption of goods actually declines with a declining price level" because *"in such periods* the buying power goes down faster than the prices."

The italics are by this writer. It is too bad that the President did not recognize that conditions "in such periods" of general deflation and panic offer a very treacherous basis for such sweeping conclusions. He would be on sounder ground if he were to hold that lower costs increase purchasing power only when they are reflected *in lower prices relative to income,* thereby widening markets, swelling volume and expanding employment. Most qualified authorities agree that here is the road to the President's declared objectives.

BUT he will have none of it. He objects to the reduction of costs. He says he wants higher purchasing power but denies that lower costs can help to achieve it. To him purchasing power appears to be wholly a matter of money wages.

But, after all, purchasing power is but the ratio of income to prices. And if we reduce prices without commensurate reduction of income does not that increase purchasing power? And is not the reduction of costs through more efficient employment an essential step toward the lower prices that enable income to buy more?

All this the President discounts, however, in the following terms:

"You can cheapen the costs of industrial production by * * * the development of new machinery and new technique and by increasing employee efficiency. We do not discourage that. But do not dodge the fact that *this means fewer men employed and more men unemployed.*"

Again the italics are by this writer. Now, if the President really believes in his "fact," why should he *not* discourage "the development of new machinery and new technique and increasing employee efficiency"? For if his "fact" is indeed a fact, the way to increase employment is to suppress the research that develops new technique, close up the plants that produce the new machinery and put a premium on the incompetent worker.

COMMON sense, however, rebels at such a conclusion; ordinary experience tells us that it is all wrong. And the explanation is that the President's "fact" is not a fact at all. It is his too ready acceptance of such "facts" that accounts for his endorsement of industrial theories that frustrate his own admirable solicitude for the social welfare by their fatal disregard of the practical processes by which alone we can create the resources necessary to that welfare.

The fact is that during the sixty years from 1870 to 1930 we had in this country the greatest "development of new machinery, new technique and increasing employee efficiency" in all history, coupled with expanding employment and a consistent rise in the general standard of living. And, be it noted right here, the economic collapse that closed that period was precipitated by an orgy of credit inflation and speculative excess, not because of the rational and healthy efforts of men to increase the productivity by which alone they can achieve a more abundant living.

From 1870 to 1930 the population of the United States increased by 218 per cent and the number of those gainfully employed increased 291 per cent. While the part of the population gainfully employed increased from 32.4 per cent to 39.8 per cent, the number of children between five and fifteen years of age, gainfully employed or not at school, decreased from 10.7 per cent to 2.9 per cent of the total population and those attending school increased from 16.6 per cent to 22.7 per cent of the total.

(To be concluded in an early issue.)

Willard Chevalier

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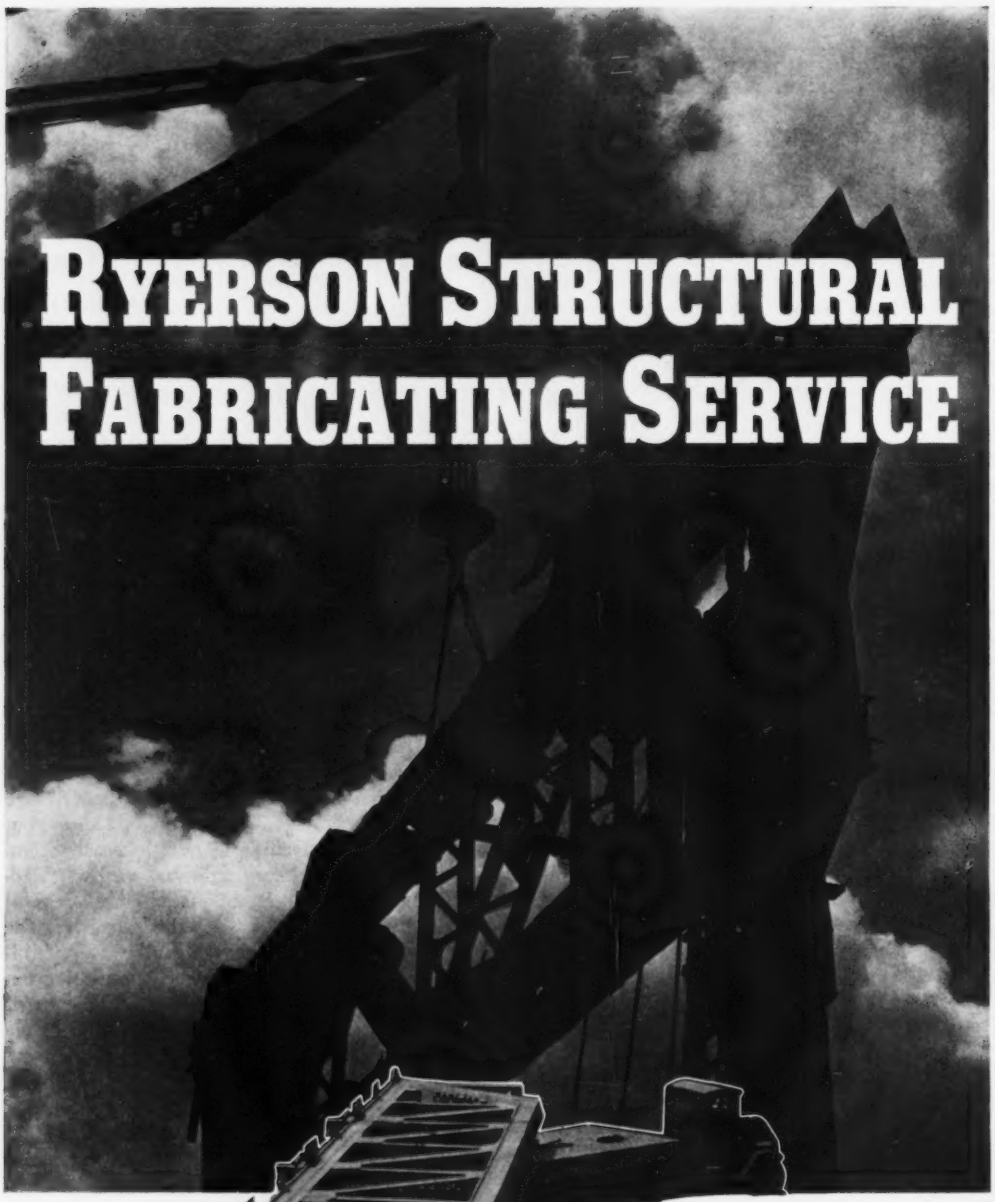

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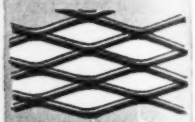
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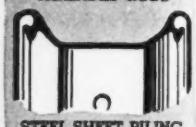
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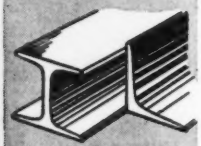
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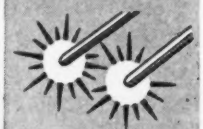
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What Transport Crisis?—Prof. John. S. Worley, transportation authority at the University of Michigan, asks the question only to lay it low again in the first of a series of articles to begin in next week's issue. Transport is suffering no debility but is merely bedeviled by a lot of misguided and inexpert regulation, largely of its own making, says Prof. Worley, whose unbiased analysis will promote understanding of an over-propagandized industry.

Traffic markers of Atlas White Portland Cement on West Jefferson Avenue, River Rouge, Michigan
Installed by Board of County Road Commissioners, Wayne County, Michigan. J. K. Norton, Road Engineer

UNTIL two years ago, traffic on this street *crawled*. Now cars move swiftly, orderly, *safely*. The change came when, in 1934, the pavement was widened to 90 feet, and a marker of Atlas White Cement was installed straight down the middle.

In town, or in the country, the fellow behind the wheel has a wholesome respect for these white markers. (Many drivers would no more think of crossing the line than of crossing a hard-boiled cop.)

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ATLAS WHITE PORTLAND CEMENT FOR TRAFFIC MARKERS

ENGINEERING NEWS-RECORD

June 4, 1936

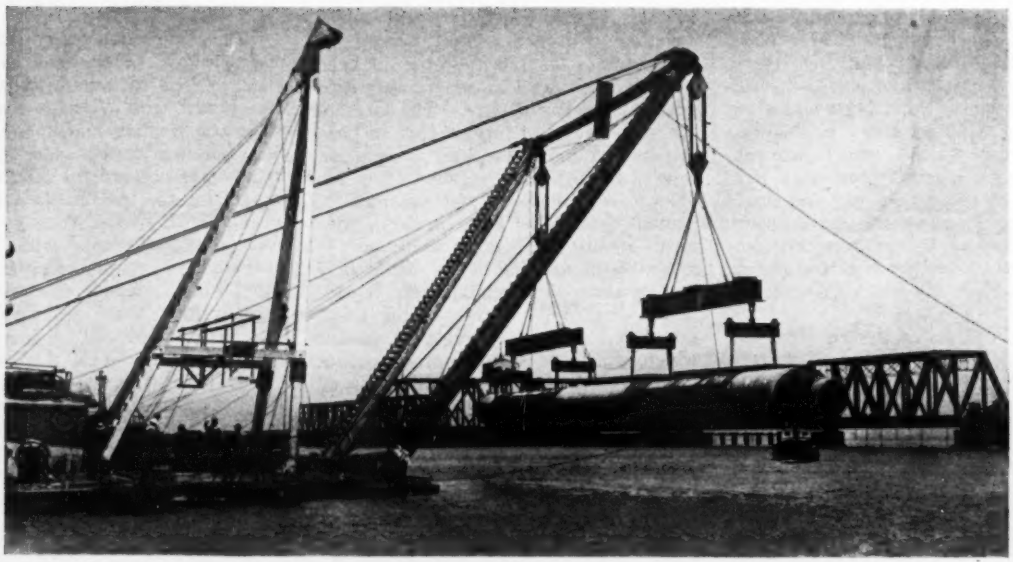


FIG. 1—LOWERING a 120-ft. pipe section into San Francisco Bay using a four point suspension to handle the 100 ton load.

Submarine Pipe Lines For Water

Hetch Hetchy water brought across San Francisco Bay through concrete jacketed 54-in. steel pipes, laid in 120-ft. lengths on a submarine pile trestle constructed by divers

By Leslie W. Stocker

Chief Civil Engineer, Bureau of Engineering, Public Utilities Commission, San Francisco

TWO 54-in. pipe lines 2,600 ft. long, have been laid beneath the southerly end of San Francisco Bay to bring water from Hetch Hetchy and other sources east of the Bay to reservoirs of the San Francisco peninsula. The submerged pipes are part of what is known as the Bay Crossing pipe line No. 2 of the Hetch Hetchy aqueduct; they parallel a 42-in. ball-and-socket submerged line built 10 years ago. The Bay Crossing line No. 2 as a whole increases capacity of the transbay lines by 65 m.g.d. and brings the total up to 110 m.g.d. To give flexibility in operation, crossover connections and sectionalizing valves installed at both ends of the submerged lines make it possible to withdraw from service any one or any two of the three submerged lines without interrupting flow in the other line or lines. In addition to facilitating repairs, this flexibility of connections makes it possible to take water from two different sources to two different destinations. In connection with these lines on the bay bottom another item in the same general project is a similar 54-in. line 435 ft. in length built beneath Newark Slough, a navigable channel to the east of the main bay crossing.

Different designs considered

In planning the new submarine lines, consideration was given to two different designs: (1) pipe made up of long sections with joints flanged and bolted, laid on submarine pile trestle in dredged trenches and (2) pipe lines consisting of short sections of pipe with flexible joints connected above water and lowered to rest directly on the bottom of dredged trenches.

As the water depth averages 50 ft. and ranges up to 70 as a maximum, the submarine trestle plan raised the question as to whether such a structure could be constructed with sufficient accuracy at these depths. Also consideration was given to joint design that would permit slight deviation from true alignment and still give a satisfactorily tight joint when bolted up by divers.

The ball-and-socket type of joint, on the other hand, which was used in the construction of Bay Crossing pipe line No. 1 (*Engineering News-Record*, March 18, 1926, p. 434) is a well known design but so far as could be learned never has been used for an important line over 42 in. in diameter under pressures at all comparable with those on this job. Here the unbalanced working pressure above outside water level will be 175 lb. per square inch. However, assurance was offered the city by a manufacturer of such pipe that successful laying and operation of a 54-in. ball-and-socket line would be guaranteed.

When bids were invited, to broaden the field of competition, permissible designs included (1) the ball-and-socket, flexible-joint type, (2) the type that would be bolted up on a submarine trestle and (3) a combination type using high strength cast-iron, bell-and-spigot pieces riveted to the ends of a steel plate section surrounded by a reinforced concrete jacket and coated on the inside with a centrifugally placed concrete lining. In this last named type the joint between the cast-iron pieces and the steel was to be made watertight by calking lead into the joint.

When proposals were opened March 6, 1935, six bids were received on bolted-joint pipe on trestle, ranging from $698,000 to $987,000. There was a single $928,500 bid on flexible-joint, cast-iron pipe, and no bids on the combination steel and concrete pipe. Contract was awarded to the lowest bidder on the bolted-joint type.

The total cost of the old 42-in. ball-and-socket pipe (No. 1 line) was about $600,000 or $190 per foot. In the present construction the two 54-in. submarine lines together cost less than 20 per cent more than did the single 42-in. line. Some of the more important unit prices in the recently completed contract are given in the accompanying table.

Features of design

The design adopted includes steel pipe ¾ in. thick with an inside diameter of 54 in., lined with an enamel (coal-tar type) applied centrifugally over a sprayed priming coat. The outside was coated with enamel brushed on over a primer coat. Centrifugal spinning was used in applying the lining, to obtain the very smooth surface which this affords. In the 6-in. concrete jacket with which the outside of the pipe was armored a single layer of welded wire cloth reinforcing was used, and the concrete was made with 2 bbl. of cement per cu. yd.

The steel pipe was fabricated in 30-ft. sections, four of which were butt welded together with heavy steel flanges on both ends of the 120-ft. sections. Lead gaskets originally 1 in. square were used between the end flanges. The faces of the flanges are so formed that in bolting up the joints the lead is squeezed toward the inside of the pipe (Fig. 3). It was not expected that the pipe as actually laid would be in perfect alignment, because some error would be unavoidable in working at the depths prevailing along this location. An important object in the design of the joint, therefore, was to provide a gasket which would be sure to accommodate itself to the variation in thickness of gasket space around the circumference and otherwise to assure watertightness all around the joint.

Details of design of the submarine structure and of the concrete work done after laying of the pipe are shown in Fig. 4. The pipe is supported on trestle bents with a timber cradle or saddle above the cap. The cradle is made of two blocks, one for each side of the pipe, with provision for transverse adjustment to allow for minor inaccuracies of grade and alignment.

A group of piles was driven at the location for each flanged joint and after completion of the joint a concrete anchor block was poured around the joint with the aid of tremies. Where the pipe is straight or has only a very small deflection at the joint these blocks serve merely to support the pipe and encase the joint for protection against corrosion. Where the deflection is sufficient to require it, however, the blocks are larger and serve as anchors.

Pipe manufacture

Steel pipe sections were fabricated in 30-ft. lengths, each made up of two plates rolled to semi-cylindrical form and joined with V-welds made by an automatic welding machine. Each section was then tested under an internal hydrostatic pressure of 500 lb. per sq. in.; during the test the plate was struck on both sides of the welds by hammers automatically dropping while the pressure was on. After the enameled coatings were applied several sections (usually four) were lined up and joined with circumferential hand V-welds. The end flanges were then welded on and the bare strips at joints were coated. This completed the fabrication of the steel portion used in each assembled section. Ordinarily made up of four 30-ft. lengths, the total assembly including end flanges amounted to slightly more than 120 ft.

After being enameled, the pipe stood in the yard for some time exposed to the hot rays of the sun with the result that some of the enamel separated from the priming coat. Portions exposed to direct sunlight were then painted white as shown in Fig. 5, after which there was no further trouble from this cause.

From the steel fabricating plant to its place in the bay crossing, the pipe was transported on barges, and these barges were found to be the most convenient place on which to complete the 6-in. concrete jacket put on the outside of the steel shell. Wooden forms for two 120-ft. lengths were built on each barge and the concrete jacket was poured and cured while the barge was anchored alongside the wharf of the steel plant. A nearby plant supplied and delivered ready-mixed concrete for the jacket.

FIG. 2—THE HETCH HETCHY submarine pipe lines in relation to San Francisco and the peninsula reservoirs.

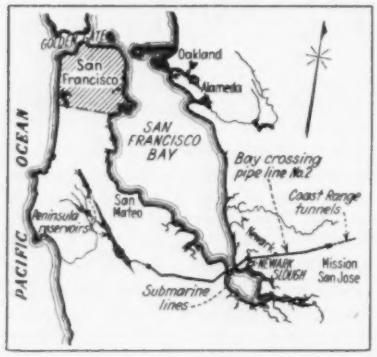
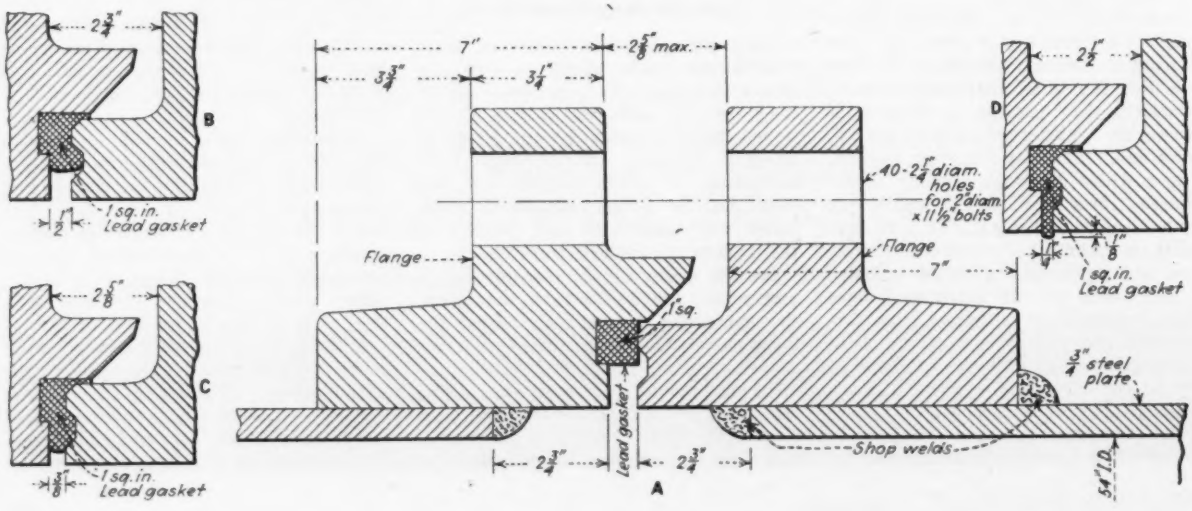


FIG. 3—FLANGED JOINT DETAILS on 54-in. submarine pipe. A shows 1-in. square lead gasket in place but not yet distorted by bolting up flanges. B, C and D illustrate conditions found on inspection after air test. B shows condition of joints that leaked. C shows average condition after tightening bolts. D shows ideal condition obtained in some joints.



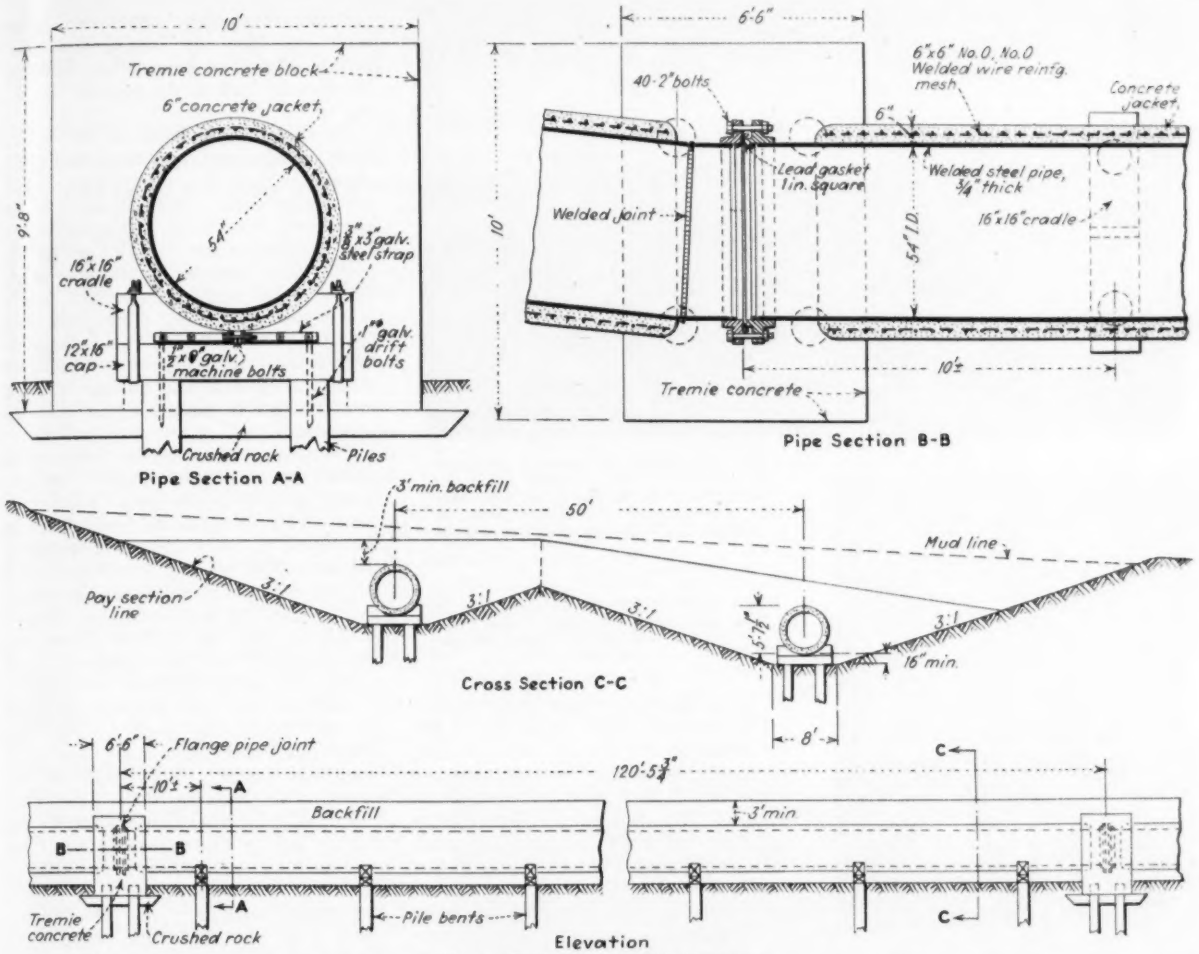


FIG. 4—SUBMARINE TRESTLE and arrangement of joints and anchors on Hetch Hetchy pipe line.

After the steel shell was placed in the forms and supported on cast iron chairs, the ends of the 120-ft. assembly were closed with blind flanges and the pipe was filled with water pumped from the bay. An internal pressure of 200 lb. per sq. in. was maintained throughout pouring operations and for 72 hours after the concrete was in place. External vibration was used to insure effective distribution of the concrete around the reinforcing and proper filling of the forms at the bottom. The weight in air of a completed 120-ft. assembly was about 100 tons.

Trench and trestle

The trench in which the pipe was to be laid was excavated with a clamshell dredge to about 4 ft. below the bottom grade of the pipe. This additional depth below the pay section. (Fig. 4) was to give the divers space in which to work. The bay bottom in this location is fairly stiff clay with occasional sand; this material stood well as excavated and the trench showed no tendency to refill under influence of tidal currents. On the contrary, for several hundred feet the trench was deepened by the currents and excavated material deposited alongside the trench to be used later in backfilling was carried away to such an extent that a considerable yardage had to be brought in by barges later to complete the backfilling.

Piles were driven with long extension leads and an underwater air hammer. They were cut off to exact grade by a diver using an air-driven saw. Although piles and the caps and cradles resting upon them were to be fully covered by the backfill, all this timber was creosoted for protection against marine borer attacks prior to backfilling. This measure, inexpensive in proportion to the total cost of the work, was thought to give somewhat better assurance of permanence in the foundation.

TABLE I—UNIT PRICES ON MAJOR ITEMS IN SUBMARINE LINE

Excavation of submarine trench (including subsequent backfill)	$1 per cu.yd.
Furnishing creosoted piles	60c. per lin.ft.
Driving piles (cut to grade at average depth of 50 ft.)	$20 each
Creosoted timber (furnishing and placing)	$110 per m. ft. b.m.
Tremie concrete (two classes)	$38 and $40 per cu.yd.
Steel pipe (54") with concrete jacket (furnishing and placing)	$65 per lin.ft.
Cost of angles in 54-in. pipe line (to cover fabrication of steel special)	$150 each

The top surfaces of the piles, after the cut-off, were covered with creosote-saturated felt pads nailed on. The caps and cradles then were placed. The two cradle blocks for each bent were left somewhat farther apart than required by the pipe width, thus making it possible to adjust them to the exact position of the pipe after placement.

Survey control work during the construction of the submarine trestle was done with the aid of range lines established on the east shore and a base line run on the railway bridge which crosses the bay about 500 ft. south of the pipe location. The survey control above water was practically exact and remarkable precision was attained in transferring points to the bottom. Checking on driven piles showed only a very few cases with an error exceeding 6 in. in the final position of the pile heads.

Placing pipe sections

A four-point suspension arrangement was used in the rig by which the pipe assemblies were lowered from the pipe-laying barge. With operations carefully checked by transit instruments, each section was lowered to exactly the prescribed position on the submarine trestle. Divers were ready to adjust the

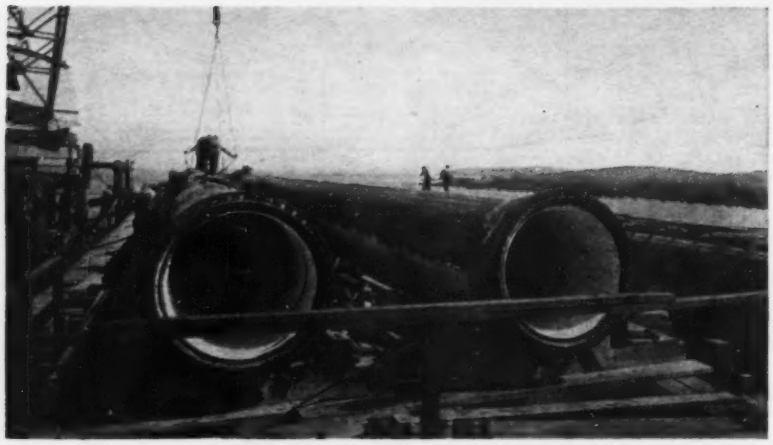


FIG. 5—CONCRETE jacketing operations on the pipe barge. Outside forms are being placed on the pipe at the left. Pipe in center is ready for outside forms. At extreme right forms are ready for concrete.

FIG. 6—PLACING a 120-ft. section of 54-in. steel pipe in the barge cradles where the concrete jacketing operations are performed.

cradles, and immediately thereafter the flanged joint adjacent to the previously laid section was bolted up. In the final stage of tightening the bolts, the pull was supplied by hoists on the barge taking up on lines running down to the wrenches manipulated by the divers.

The contract called for a test of the line under an air pressure of 50 lb. per sq.in. and finally a hydrostatic pressure test at 200 lb. per sq.in. as measured at sea level. The short length of submarine pipe across Newark Slough passed both tests without evidence of leakage. On the Dumbarton lines the air test showed very small leaks at two field joints in one line and at one joint on the other line. Later, examination made on the inside of the pipe showed that most of the joints bolted up under water have a space of $\frac{1}{8}$ in. or less between the end faces of the steel flanges. In a few joints, including the three that leaked, this space is as much as $\frac{1}{2}$ in. To correct this, these wider joints were caulked with lead from the inside, thus completely filling the recesses not filled by the flow of lead in the process of bolting up.

The final hydraulic test at 200 lb. per sq.in., under the specifications, could show a leakage of not more than 26 gal. per day per joint. With 26 joints in the submarine line this is the equivalent of 676 gal. per day for each of the 2,800-ft. lines. These pressure tests were made late in April and each 2,800-ft. length was tested separately. Both lines were found tight; the amount of leakage at terminal valves (which was measured) was just equal to the amount pumped into the line to maintain the specified pressure.

The concrete anchors at joints were poured by the tremie method from a barge spotted successively over each joint. Afterward backfill was placed in the trench to cover the entire length of the submerged pipe by a minimum of 3 ft. All work below water was inspected and checked by a diver in the employ of the city and the interior of the line was inspected and also surveyed with transit instrument to check location.

The new bay crossing was designed by the engineering staff of the San Francisco water department and was constructed under supervision of the bureau of engineering of the San Francisco Public Utilities Commission by the Pacific Bridge Co. as contractor. The personnel on the job was as follows: For the water department, N. A. Eckart, general manager and chief engineer; I. E. Flaa, hydraulic engineer in charge of design. For the bureau of engineering, L. T. McAfee, utilities engineer; Leslie W. Stocker, chief civil engineer; L. A. McAtee, construction engineer. For the contractor, Philip Hart, president; A. E. Graham, superintendent.

Utility Service in Flood Time

A RECORD of the experience of the Duquesne Light Co. in the great flood at Pittsburgh on March 17 to 20, given in a special issue of the Company's house organ, "Public Service," for April, makes available official facts on the interruption of powerhouse and substation service by the flood, and the vast range of emergency work necessary to restore service and rehabilitate the system.

Concerning the breakdown of the power stations the leading article says:

> The system was designed to operate under flood conditions greater than those of past record. No one could predict, nor would anyone have believed it possible, that the water could reach a level that would flood Brunot Island, surround Colfax power station and reach unprecedented levels in the downtown section.

Preparations to protect the plants also could not be made, as the forecasts were hopelessly inadequate. On March 17 the Weather Bureau at 10 a.m. predicted a crest stage of 33 ft.; that evening it changed the forecast to 36-37 ft., and by midnight raised the estimate another foot. Just before midnight of the 18th the actual crest of 46.2 ft. was reached.

The effect on the power houses is thus reported:

> When the flood passed the 37-ft. stage it was impossible to prevent damage. The bulkheads held at Colfax but water filtered through the cracks in the basement and entered the generator air ducts. The Reed Station held but water reached the cable pot-heads in the basement of the switchhouse. The old Brunot Island Station was flooded up to the windings of some of the units. Damage was suffered by some of the cables which connected the Brunot Island generators to the new switchhouse. A 66,000-volt river crossing tower on Brunot Island was undermined and toppled over, opening the high tension ring between Brunot Island and Ambridge. The 11-kv. cable tunnels in the basement of the switchhouse were finally flooded, isolating the entire island. At Colfax considerable damage was done by water to equipment in the basement; motors were submerged and mechanical piping damaged.

The outside switch yards at Brunot Island and Colfax were partly under water, Colfax to a depth of 3.5 ft. In addition wire lines were broken by debris that floated down the river and knocked down poles. Fourteen substations were flooded. Some to 9 or 10 ft. above the main floor, and 41 high-tension customer substations were affected, 15 being 10 to 20 ft. under water.

Maintenance of power on some parts of the system was possible through a minor tie-line at McKeesport.

Frost Takes Toll From Road Transport—I

Frost and snow extending farther south than in many past winters has added millions of dollars to the regular spring repair bill of main and secondary road systems in the east and south

REPORTING from many parts of the United States, highway officials and correspondents tell a sad story of winter damages to highways. In the nature of things specific figures are lacking—winter damages are of a kind that do not disclose their effects quickly. Until frost boils and heaves have subsided and the water has drained away, areas and depths of damages calling for new foundations and subgrade drainage cannot be estimated. It is reported that much of the damage comes within the classification of ordinary maintenance work and, on the contrary that much calls for extensive reconstruction of miles of road. Until the final audit, few road departments will know the toll that winter has taken of road structure and this audit cannot be made this year because complete repairs must be widely postponed due to lack of funds.

The cost that winter has exacted of transport is even more uncertain than the final repair bill for road structure. Few departments have the data on which to base even a guess. In many states snow blockades and floods have so greatly impeded free vehicle movement since last December that the spring breakup is insignificant as a hindrance to traffic. By and large it has been serious in multiplying detours and in closing miles of roads to heavy vehicles.

The account that follows of winter damages to roads is not statistical. It is rather a narrative of the observations of a widely scattered editorial staff, of correspondents reporting regularly and of highway officials writing from two scores of states. For convenience in presenting this information and also to classify in a measure the areas of greatest damage the reports are summarized by geographical groups of states.

North Atlantic States

New England roadbuilders, accustomed to deep frosts, take the spring breakup of roads rather calmly. While the damage has been greater generally than is normally expected it will call for only normal maintenace methods of repair. The March flood (*ENR* 3-26-36) destroyed bridges and roads so extensively in Maine, New Hampshire, Massachusetts and Connecticut that frost heaves and surface pitting, although greater than usual, rank second place in the present concern of highway officials. They refuse to be excited in the least about winter damages.

In Vermont the survey indicated some increase above the normal in frost damages but nothing to interfere seriously with travel; in fact many roads usually "posted for load limit" were not so posted this spring. Similarly in New Hampshire it was stated that in many cases frost damage this year was "appreciably less" than in former years. This improvement, it was stated, had been largely due to extensive installation of side drains and the application of other corrective construction to water-bearing areas along the highways. In Rhode Island also the winter brought few frost boils, heaves or settlements although some of the very old black-top roads suffered an "expected pitting." It was estimated that $150,000 would take care of all unexpected needs including flood damages. Both Massachusetts and Connecticut experienced heavy frost damages to town and the older secondary system roads but in the stress of work to restore flood-damaged structures no very complete survey of frost action had been made by either state.

Swinging south along the coast, New Jersey, Maryland and Delaware highways were hit hard by frost action more severe and more widely extended than had been experienced in many years. No estimates and only a general survey of frost damages have been made in New Jersey but it has been extremely severe, "much more severe than it has been at any time in the last 15 years." Maryland had one of the worst winters in its history. Roads were damaged beyond anything previously known to the state road commission. In commenting on road conditions Nathan L. Smith, chief engineer, said:

> There are several things which must be taken into consideration in connection with the unusual damages at this time. First, the primary road system of Maryland was completed in 1915. Some additional widening and strengthening of the surfaces on many of these roads has been done

WATER SEEPING up through patched concrete pavement indicates a condition of subgrade characteristic of many places on main road systems.

REPAIRING A FROST BOIL in a black-top road; this repair operation is typical of scores that are being carried out over the frost zone of the past winter.

since that time, but, primarily, the roads were designed for the type, volume and weight of traffic which passed over the highways 20 years ago, and not for the type of automotive transportation which has developed in recent years.

During the past winter, we had an unprecedented continuous cold spell which permitted the ground to freeze to depths varying from 30 to 48 in. There were many snow storms, and the snow lay on the ground the entire winter. As it fell on the highways, it was pushed to the edge of the road by our snow removal operations. The rights of way generally, in Maryland, are very narrow and in but a few instances was it possible to remove this snow entirely from the shoulders of the road.

When the thaw came, the melting snow provided a continuous source of water and when the roads started to break up, investigation disclosed that in many instances a completely saturated subgrade which had melted to a depth of about 1 ft. under the roadway pavement, but was supported on solidly frozen ground which prevented the water from draining off. Naturally, the pavements broke up under this condition; many frost heaves occurred on concrete pavements, an occurrence almost unknown in this state.

Another factor which caused considerably more damage in Maryland than ordinarily would have occurred, was that neighboring states, under their motor vehicle laws, had the authority to reduce loads whereas, in Maryland, we have no authority to reduce loads under the maximum legal limit. As a consequence, considerable trucking, during the thawing period, was routed through Maryland to avoid highways where loads were restricted. Likewise, many loads went out from Baltimore and were intercepted at the state line where reductions were enforced and had to go back through Maryland to make connections on other highways on which restrictions were not being placed.

It is estimated that the cost of repairs to these roads will be many times more than for any previous spring break-up. The total cost cannot be estimated as many roads were considerably weakened, although they have not actually broken through up to the present time.

As in Maryland the roads of Delaware experienced an unprecedented winter attack. As estimated by W. W. Mack, state highway engineer, the repairs of frost damages will cost $150,000. He said:

The extent of frost damage is very much greater than in any previous year, this being the first year in the history of the highway department when there was any noticeable heaving of concrete roads, except that during 1934 and 1935 there was some small amount of frost heave in the northern part of New Castle county; this year it has extended over the whole state. This was due, perhaps, less to the fact that we had colder weather than to the fact that the ground has been saturated with water since early fall. This spring the continued high water level and continued rain have made repairs both slow and unsatisfactory, it being impossible, to make satisfactory patches on bituminous roads where it rains about every other day. Repair costs in Delaware are largely restricted to macadam and the lower types of highways, concrete having cracked somewhat but not having failed so as to cause extensive repairs. Frost boils were much more extensive than in any year since 1918.

Again, in New York, highway officials are positive in assigning to fall rains the main cause of heavy frost damage. No estimate of damages coming within regular maintenance operations was considered practicable, but it was stated that the department anticipated "spending about $3,000,000 on roads which are in such condition that repairs are not economical and the roads must be rebuilt." The most of this damage, fortunately, is on secondary roads where a cheaper type of reconstruction is possible than were the damage on primary roads. In Pennsylvania it was stated frankly that with flood damages occupying first attention the count of frost damages was not at all thorough, but the general opinion is that it has been the most severe winter, insofar as its effect on roads is concerned, in the history of the department and will result in a great increase in both maintenance expenditures and resurfacing and reconstruction work that will have to be undertaken during the coming summer.

South Atlantic and Southern States

In the south the toll taken of road structure by frost damages is enormous. No complete estimates are available but from scattered figures it is evident that the total will be many millions. Serious damage resulted as far south as central Georgia and northern Alabama while the northern tier of states including the Virginias, the Carolinas, Tennessee, and Kentucky suffered something like real frost devastation of roads. Commenting on the general situation S. T. Henry, southeastern editorial representative of this journal, basing his remarks on personal observation says:

Serious damage resulted as far south as central Georgia and northern Alabama. In fact, black-top surfaces went to pieces even further south, but it may not be safe to attribute the unusual failures to the cold. Engineers with whom I have talked consider the excessive rainfall during the winter raised the groundwater in these further-south sections until many subgrades became waterlogged and breakage of the surface resulted.

As a general policy the southeastern states have built the different types of black-top roads to the best standards of the country. In fact, South Carolina and Tennessee deserve special credit for the advanced design and construction methods they have developed for such work. In other words, the failure of black-top roads in the southeast was not due to lower-class design or execution. Wheel and total loads permitted on highways by the southeastern states compare favorably with the rational standards of the country. The failures were thus not due to unusual abuse. Alternate freezing and thawing were the real causes. Keep in mind that even in this unusual winter there were frequent thaws down here.

On account of the wide variety of failures and the fact that they occurred in recently completed surfaces of the most approved types, as well as in surface treatments of longer standing, black-top construction is open to much question in the southeast. None of these states can afford, on the other hand to build all-concrete roads. Hence, we may expect a continuation of black-top construction on about the same scale as in recent years. Greater care will be taken in an effort to get better drainage. All southeastern engineers also are studying to determine whether deeper ballast under the surfacing on weak spots will help. None of them seems to have the answer.

Funds to make adequate repairs are lacking. In North Carolina a division that had $650,000 damage has been allotted $280,000 for repairs; that is about the relative situation in all parts of the southeast. Unless funds are diverted from those needed to match federal aid for construction, many roads that are in bad shape will merely be glossed over this year. Patching will in most cases take the place of much-needed complete resurfacing. A vast amount of resurfacing will thus be accumulated for future years. Meantime, traffic will have to use roads that are unfit for modern speeds and even reasonable loads.

Statements of state highway engineers confirm this general conclusion and furnish some impressive quantitative evidence. Speaking of North Carolina, W. Vance Baise, state highway engineer, states:

Our experience has been that the past winter did more damage to all types of roads in this state than any other five years combined since our big construction program began in 1921. While the surface-treated roads suffered more than other types, there was also material damage to our high-type roads and to those county roads which were constructed of topsoil, sand clay and gravel. Many of these roads which held up very well through other winters became impassable during the past winter as a result of the heavy freezes, subsequent thaws and heavy rains. The thawing of these roads opened up the surfacing and permitted water to go through to the subgrade. As a result, the roads cut up badly under heavy traffic and turned the surfacing material into the subgrade in many cases so that a considerable amount of this has been lost. In many cases the damage has been very heavy on surface-treated roads due to water getting into the subgrade caused either by the surfacing not being thoroughly sealed or water seeping in from the side ditches. Where the base material contained an excess of clay, this of course caused frost action and resulted in deterioration of the surface treatment.

During the period from 1933 to 1935, the appropriation for maintenance of roads in this state was materially reduced by the necessity for retrenchment along all lines and it is rather difficult to estimate the amount of damage which roads suffered during the past winter as a result of lack of sufficient funds during the two previous years to maintain them properly. This is especially true of surface-treated roads

since in many cases it was not possible to retreat these at the proper time, thus the asphalt became deadened and water got through very easily during the adverse weather. It is estimated that the total damage during the past winter to surface treated roads, of which we have 4000 miles, was around $1,500,000 and it is believed that damage to other types of roads would amount to a considerable sum. However, it is impossible to estimate this accurately at the present time.

Combining damage to roads from frost and from floods in one statement, M. W. Smith, chief engineer of the West Virginia department sums up his state-road troubles in the following impressive figures.

From very careful estimates, the roads of West Virginia were damaged from the ravages of the winter season of 1935-1936, over and above ordinary wear and depreciation, to the extent of $4,069,150.

In addition, West Virginia has also suffered heavy losses to both roads and bridges from the floods of March, 1936. From this cause our highways were damaged to the extent of $1,024,050 and our loss from bridges damaged and washed out amounted to $806,500, or a total loss from floods of $1,830,550.

Combining the damages due to the ravages of the severe winter season and the damages resulting from floods, we arrive at a total loss to the West Virginia highway system of $5,899,700.

Besides these misfortunes, it might be interesting for you to know that the state road commission of West Virginia expended the sum of $214,118 for snow removal from the highways of the state during the winter of 1935-1936 compared with a cost of $84,091 during the winter of 1934-1935.

Concern over unaccustomed winter violence is equally plain in statements from Kentucky, Tennessee and Arkansas. Arkansas reports that March zero weather in the northern counties followed by a quick thaw caused a damage of $150,000, of which $51,000 was on gravel roads and $94,000 was on blacktop roads. In Tennessee state maintenance engineer D. W. Moulton says:

During the past winter we have experienced the most severe cold in the history of our highway department. As a result, the damage to roads by frost has been greater than ever before experienced since the organization of the department. We have under maintenance on our state highway system about 7,600 miles. About 2,000 miles is composed of retreads and light surface treatments constructed principally on traffic-bound bases averaging not over 4 in. in depth. We have in addition 3,000 miles of traffic-bound stone and gravel roads. It was to these two classes of construction that the greatest damage by frost occurred. We have estimated the cost of repair on these two types of road as $750,000 in addition to the normal cost of maintenance at this time of the year. Our yearly maintenance cost in Tennessee over the period of the last three years has averaged $3,000,000 per year.

In Kentucky it is estimated that extraordinary maintenance due to severe winter cold will cost $2,000,000. It is stated that the past winter was, without a doubt, by far the most destructive to roads that has been experienced in Kentucky for the last 35 years. Many roads, including some main routes which had never before in the history of the state highway department given any trouble, broke up; and, in some instances, became impassable for short periods of time. On some of the main routes and on many of the secondary routes the highway commission has in past years placed thin surfaces of stone or gravel with the idea of getting as many people as possible out of the mud as quickly as possible. These thin roads have been in service, most of them, for a good many years, and until this winter had never given trouble of any consequence, but the severe weather during the past winter has broken some of them up very badly.

(This account of frost damage to roads will be continued next week with a survey of the northern Mississippi valley and western states.)

Power Line Poles Made Unscalable

THE Salt River Valley Water Users Assn. at Phoenix, Ariz., maintains a power distribution system on the project which includes about 1,000 miles of secondary line with voltages ranging up to 2,300. Most of the lines are carried on steel poles built up with central lacing. Unfortunately, this lacing proved to be a convenient ladder for children and tempted them to climb. They went up the poles after kites or just for fun, and a series of fatalities resulted from children coming in contact with power wires. Thus it became necessary to find some way to discourage children from climbing. It was decided that the most effective and inexpensive way would be to fill in the central portion of each pole with concrete to a height of about 8 ft. above the ground, thus making it impossible for children to climb without first using a ladder of some sort. This plan has proved entirely satisfactory; there have been no more accidents since the concrete bases were poured.

The concrete bases were placed by a five-man crew using a 7-cu.ft. concrete mixer on a pneumatic-tired trailer. A three-man form crew placed the forms ahead of the concrete crew and removed them after the proper setting period. One material truck and a total of 100 sets of forms constituted most of the other equipment used.

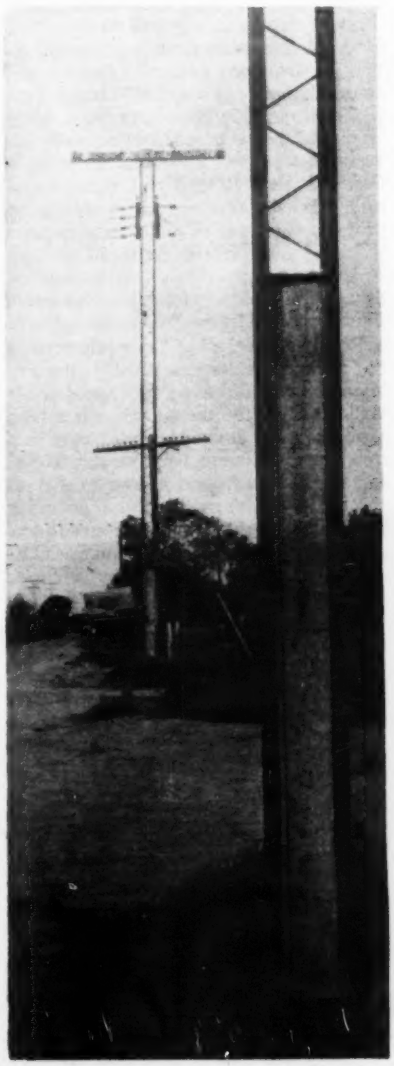
The forms were made in two lifts or pairs each 4 ft. long. The lower 4-ft. section was placed and filled first, after which the top section was put on and filled. Each set of forms consisted of four 4-ft. pieces of 1x12 and eight pieces of 2x4 slotted at the ends for bolts with wing nuts so they could be clamped in place quickly and easily.

About ¼ cu.yd. of concrete was used on each pole. The maximum size of the aggregate was 1 in., to make sure that the concrete would go in place around the steel lacing. The mix was 1:2½:5. Under favorable conditions 66 poles could be concreted in one 9-hour day.

Accurate cost records showed the total cost per pole to be $2.786.

As the form cost and miscellaneous items were included in this record on the first 1,200, the estimated average cost for the 4,800 poles that were encased is brought down to $2.25.

CONCRETE filling around lacing of steel power poles eliminated risk to children. The lacing appears above the concrete base



New Soil Sampler for Deep Tests

Requires no casing for deep foundation tests—Retractable plug in end of tube permits driving to desired depth—Cost and time of sampling greatly decreased

RECENT IMPROVEMENTS in the soil sampling device adapted to deep foundation testing for work on piers of the San Francisco-Oakland Bay Bridge in 1932, have made it possible to avoid the delay and expense incidental to driving and cleaning out a well casing before taking samples. The new feature of major importance is a retractable plug that permits the sampler to be driven to place. However, the entire device has been redesigned for heavy duty and the equipment now used has little in common with that described and illustrated in *Engineering News-Record*, June 23, 1932, p. 891, except that of purpose, which is to secure samples in an undisturbed state for laboratory tests including determination of moisture content, density and consolidation. Since 1933 more than 13,000 lin.ft. of cores have been taken from 232 holes in connection with investigations for the San Francisco-Oakland Bay Bridge and other highway, bridge and grade separation projects. This is in addition to several thousand feet of tests 30 to 50 ft. deep in connection with miscellaneous foundation studies for the California Division of Highways.

Prior to developing the equipment to the advanced state described in the following it was necessary to put down a well casing to the depth at which samples were desired. Great care and slow progress were necessary in cleaning out the casing so as not to disturb the material into which the sampling device was to be driven. Conventional equipment (*Proceedings*, Am.Soc.C.E., May, 1933, p. 804) usually included a vent hole with either a flap or ball valve at the top of the sampler section. If sand or silt particles lodged in the valve and prevented a satisfactory seal against suction the sample was likely to be lost.

It was to obviate such difficulties that the new sampling device was designed. Now there is no need to clean an open boring before operating the sampler; in fact, no casing at all is necessary for holes up to 100 ft. in depth unless free flowing sand or gravel is encountered. Casing is driven or jetted down to aid the sampler only when skin friction is too great to permit of easy driving and withdrawal of the sampler.

On testing recently completed at the site of the San Francisco interurban terminal of the Bay Bridge, 7 to 90 ft. of casing was used to seal off overlying strata of aeolian and marine sand. Samples then were taken satisfactorily down through marine clay and clayey sand to bedrock, about 220 ft. below the surface, without sinking the casing deeper. On that job and on other deep foundation testing work the cost of taking the samples represented a saving of one-third to one-half the cost of the old method which required a well casing to be driven first. In clay and cemented materials samples have been taken at depths of 150 ft. below the bottom of a cased or open hole. Practically continuous 2-in. diameter core samples frequently have been taken from the surface of the ground to depths of 100 to 220 ft. at a total cost varying from $1 to $2.50 per foot including rental of equipment and all operating expenses.

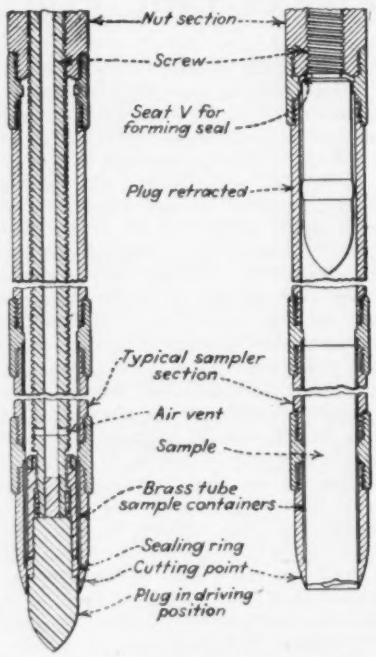


FIG. 1—LOWER END OF SOIL SAMPLER in cross-section showing (left) plug in the driving position and (right) plug in the retracted or sampling position.

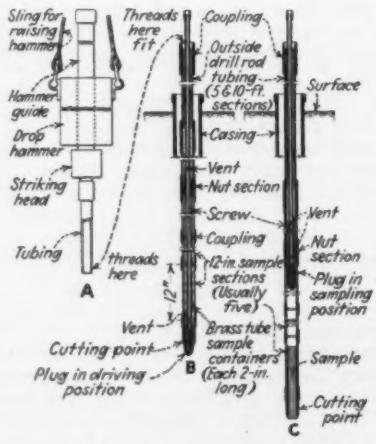


FIG. 2—COMPLETE ASSEMBLY of the soil sampler illustrated by three diagrammatic sketches: A—Drop hammer assembly. B—Assembly with plug in driving position. C—Assembly with plug withdrawn and samples within the tubes.

How the sampler functions

The lower end of the sampling tool is shown in Fig. 1. The section on the left shows the bullet-shaped plug in the cutting edge. This is the position for driving. After being driven to the desired depth this plug is withdrawn from the cutting edge by turning the screw which is actuated by an inside rod from the surface. With the plug in the retracted position the sampler is forced down still farther, thereby filling the brass tube sample containers. While this farther advance of the sampler is in process air or water can escape around the retracted plug. However, after the samples have been forced into the tubes within the tip, the plug is withdrawn still farther so as to effect a seal by closing tightly against the seat V. This protects the space in which the samples are lodged against suction that would tend to withdraw them while the device is being pulled up to the surface. As soon as the sampler is out of the hole the tip and the 12-in. sampler sections are unscrewed, the several sample containers, each 2 in. long, are removed, weighed, capped and sealed for shipment to the laboratory.

The cutting point is made from tool steel with the outside shape in general conformity with that found by Veihmeyer and by Beckett, University of California, Agricultural Experiment Station, to be suitable for securing samples of agricultural soils. The sampler sections, couplings and the cutting point are bored on the inside to receive the brass tube sample containers. In this latter respect the outfit is conventional.

In Fig. 2 a diagrammatic sketch of the sampler assembly shows the general arrangement. The extension rod and all sampler sections are provided with square right-hand threads of adequate size and coupling ends are butted against square shoulders to prevent ex-

cessive thread stress during driving. The connection between screw shaft and plug permits the plug to swivel.

Operations

The four essential operations are: (1) forcing the sampler as a plugged tube to the desired depth, (2) retracting the plug and forcing the open sampler into undisturbed material, (3) raising the plug farther to effect an air-tight seal just above the sample and finally (4) withdrawing the entire sampler unit to the surface. Ordinarily a 3- to 4-ft. length of soil core is obtained in one sampling operation. On more important work one sample is taken for each 5 ft. of depth. In many cases, however, the driving record for the plugged sampler furnishes sufficient information regarding the uniformity of the material and the operation of the test as a whole is speeded up by taking samples at less frequent intervals. Two samplers complete with plug, screw and nut assembly usually are kept on rush jobs so that progress need not be delayed while samples are being removed and prepared for shipment to the laboratory.

Immediately the sampler is withdrawn from the hole the tube retainers with contained sample are pushed out of the sampler section, cut into specimens 2 in. long with a fine piano wire saw, capped and weighed. The weight of the 2-in. lengths of core together with an examination of the material cut in separating them, furnishes an immediately available index to the uniformity and character of the material. This is useful to the field crew in determining procedure in taking the next sample. Specimens are prepared immediately for shipment to the laboratory by being taped, marked and sealed with paraffine to prevent any change in the natural state of the material. Fig. 3 shows a typical cap, tube and sample and the condition of the specimen when ready for shipment.

Samplers of different size

Samplers of three types now are used by the materials and research department. Two of these take 1-in. cores and are designed for preliminary borings up to 50 ft. deep. They are light, compact and convenient for transportation. Of these light types one is designed for operation by an air hammer and the other for hand power operation in remote locations to which air compressing equipment could not be transported readily. These two small samplers are somewhat different in design from the type illustrated but the principle of operation is the same.

The third type, already described and illustrated in detail, is the heavier equipment used for the past three years to take 2-in. cores on deep borings. Samples of this size were found satisfactory for laboratory tests and a 2-in. sampler can be operated at lower cost than equipment of larger size. The design illustrated, however, is suitable for larger diameter samples where special conditions justify the expense.

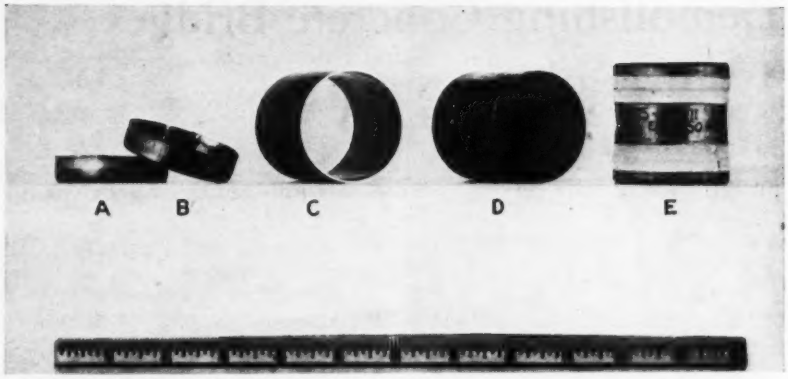


FIG. 3—SAMPLE CONTAINER AND PARTS: A and B, caps; C, sample container; D, container filled with sample; E, container capped and taped to retain moisture.

The 2-in. sampler requires power equipment. When properly powered it will penetrate formations of a hardness up to that of soft rock. It has been driven 2 or 3 ft. into bedrock where the material consisted of partially disintegrated sandstone or shale. When the site of the testing operations is accessible by motor truck, a churn drill ordinarily is used and the spudder or walking beam actuates the drop hammer. A diamond drilling machine has been used where investigations of both soil and bedrock conditions were desired. In the latter case a sturdy A-frame was provided for handling and pulling the tools. The hammer was attached to a heavy rope and rigged to a cat head through pulleys on the A-frame. Drop hammer action was obtained by first binding and then slipping the rope on the cat head. Two men were required on the free end of the line to tighten and loosen the tension of the wraps around the cat head.

Where borings have to be made from floating equipment it is customary to use a barge equipped with derrick, winch and jetting facilities. The latter may be necessary when the pulling capacity of the barge is insufficient to free the sampler from skin friction. The supplemental use of a casing is required only in soils where driving to considerable depths involves very great skin friction.

The improved sampler is a product of the materials and research department of the California Division of Highways and is the result of gradual development extending over several years. The first 1-in. hand-operated sampler was made and put into use by the Department early in 1930. Design was steadily improved during the ensuing years and early in 1933 the 2-in. sampler was brought out and used on the San Francisco-Oakland Bay Bridge.

The materials and research department is under the direction of T. E. Stanton, materials and research engineer; the sampler was devised and the original plans were worked out by O. J. Porter, associate testing engineer in charge of aggregate and soil investigational work. J. L. Beatty, junior testing engineer, aided in design improvements and suggested the screw actuated plug. George Pomeroy, chief machinist of the Department, worked out the mechanical details and constructed the first sampler unit.

Long Cantilever Span To Cross Brisbane River in Australia

CONTRACT for a 924-ft. cantilever span across the Brisbane River from Kangaroo Point to Bowen Terrace, Brisbane, Australia, has been let by the Queensland Bridge Board. The bridge, which will have a channel span of 924 ft., will be 100 ft. above high water level and will be 60 ft. wide between trusses. The roadway is to be 40 ft. wide with two 10-ft. walkways, but the bridge is designed so that the roadway may be widened to 60 ft. and the walks placed outside the trusses on brackets. The anchor spans are 270 ft.

The successful bidder was the Evans, Deakin-Hornibrook Construction Proprietary, Ltd.; the contract price was $5,770,000, but the Queensland Bridge Board set up an estimated cost of $8,000,000 to include such contingenies as interest during construction or toll deficits in the early years.

Demolishing Concrete Bridges With Explosives

In clearing Norris Dam reservoir site a single charge placed on the bridge deck usually served to wreck a whole series of arch spans

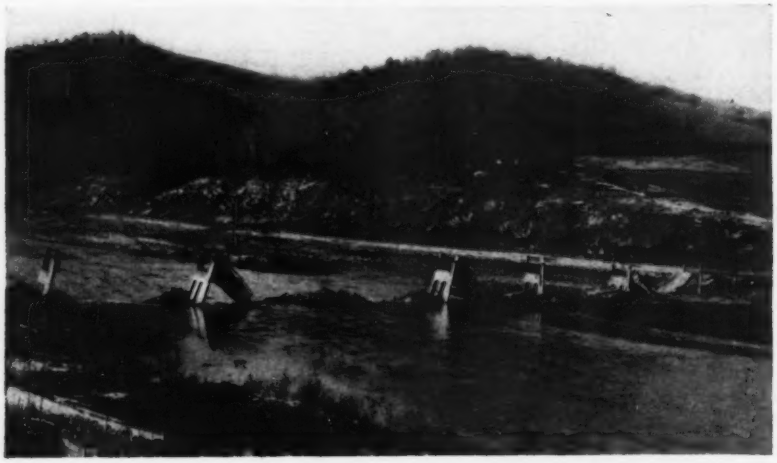
IN THE COURSE of the preparation of the Norris Dam reservoir basin, 33 bridges which would have been flooded, thereby becoming an obstruction to navigation, were removed. Five of these structures were on the Clinch River, six spanned the Powell, and the rest were located on tributaries of both these streams.

Those bridges having steel superstructures were dismantled by the Tennessee Valley Authority and re-erected at new locations, or the steel work was returned to the counties owning the bridges. The stone or concrete piers and the bridges of concrete construction could not be salvaged in this fashion and were demolished.

The demolition of the piers and concrete bridges was carried out by the Corps of Engineers, the U. S. Army Engineer Board having requested the use of the structures for making comparative tests on the effectiveness of various types of explosives used in military demolition. The work was carried on during the period from Feb. 3 to March 6, 1936, by a detachment from the Fourth U. S. Engineer Regiment from Fort Benning, Georgia, under Capt. Gilbert E. Linkswiler. The demolition was supervised by Lt. Col. R. F. Fowler, chief of the supply section, Corps of Engineers, and Capt. C. K. Harding, executive officer of the engineer board. The largest of the concrete bridges thus destroyed were the Walker's Ford Bridge, the Loyston Bridge, and the Sill Bridge, all spanning the Clinch River.

FIG. 1—A DYNAMITE CHARGE of 300 lb. that dropped seven of the eight 60-ft. spans of the Walkers Ford Bridge into the Clinch River. Note the sagging of the second span at the center, characteristic of initial failure.

FIG. 2—WALKERS FORD BRIDGE seven seconds after dynamite had been exploded on the deck of the left span.



The Walker's Ford Bridge was built in 1921 on the Hickory Valley Road between Maynardville and Lone Mountain, Tenn. It consisted of eight concrete arches of about 60-ft. span with earth-filled spandrels. The roadway width was 12 ft. in the clear between concrete railings. The arch barrels were poured in two sections, separated by a plain construction joint on the center line of the bridge. The spandrel walls were of the gravity type, poured separately from the arch barrel. Where they adjoined the piers, a keyway was provided, but no reinforcement crossed the construction joint.

In demolishing the bridge the earth fill was removed from the arch adjacent to the south abutment and a charge of 300 lb. of dynamite placed on the arch and tamped with earth. According to estimates of observers, seven seconds after the explosion all of the spans had collapsed, with the exception of the short span adjacent to the north abutment. The appearance of the bridge after the explosion indicated that most of the spans had failed in flexure at the center and that the reinforcement in the piers was insufficient to support the half-spans as cantilevers. In at least one case, the entire span sheared off at both supports and fell vertically. The fact that the most northerly span did not collapse is accounted for by the larger size and greater stability of the first pier from the north end. The stability of the typical piers was low due to their narrow width, the lack of dowels between the footings and the piers, the small amount of reinforcement connecting the piers with the arches, and the absence of reinforcement between the piers and the spandrel walls.

The Loyston Bridge, located in Union County between Loyton and LaFolette, Tenn., consisted of two 156-ft. open spandrel arches. The roadway deck was of concrete slab and T-beam construction, spanning between transverse bents supported on the two arch ribs. The width of the deck was 14 ft. 9 in.

Two charges necessary

On the Loyston Bridge, holes were made in the deck directly over the crown of the arch ribs by exploding small charges of TNT and nitrostarch. A charge of 100 lb. of TNT was placed directly on one arch rib, and an equal charge of nitrostarch on the other rib. The explosions blew out the crowns of these ribs and allowed the ends of the

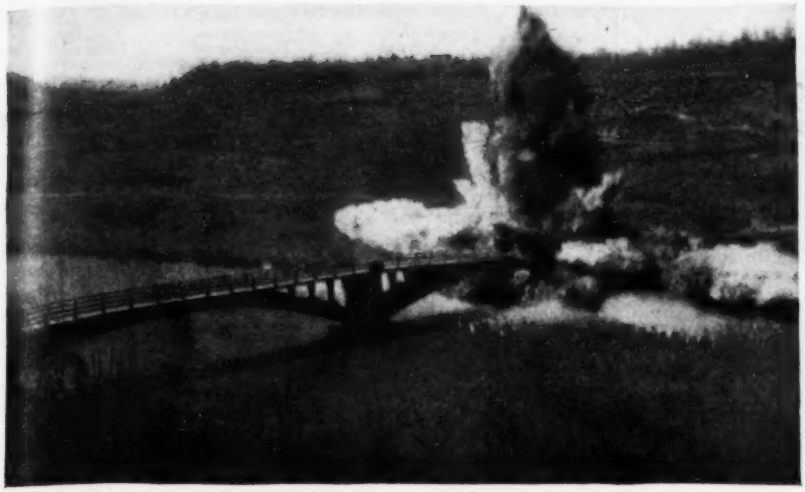


FIG. 3—TWO ATTEMPTS were necessary to demolish the Loyston Bridge, the center pier and one of the two 156-ft. spans remaining in place after the shot shown above. The right view shows the wreckage after a charge had been exploded inside the center pier.

span to fall into the river, by failure of the haunches acting as cantilevers. The adjoining span was not affected, due to the stability of the center pier.

The explosive for the next charge was placed inside the center pier at the spring line of the arches. When this charge exploded, the pier was blown out and the span moved toward the pier, failing by flexure at the crown as it moved.

The Sill Bridge crossed the Clinch on the road between Loyston and Sharp's Chapel, Tenn. It consisted of four 88-ft. spandrel-filled arches. The roadway width was 14 ft. in the clear between concrete railings, and the details of construction were similar to those of the Walker's Ford Bridge.

The Army Engineers blew up this bridge on March 6, 1936, as a swift military demolition. With all possible speed, a single charge of 400 lb. of TNT and nitrostarch combined was placed without tamping or other preliminary preparation directly over the crown of the second span from the south end. The explosion blew out the crown of the span, and the two half-spans dropped into the river. Within a few seconds the remaining spans also collapsed.

Elevated Tanks Strengthened After Earthquake Hazard Survey

Analyses of 650 existing water tank structures show 95 per cent deficient in resistance to lateral forces — Owners willing to make necessary repairs when conditions are explained

By H. M. Engle

Structural Engineer, Board of Fire Underwriters of the Pacific, San Francisco

AFTER the 1933 earthquake in Long Beach, Calif., roof tanks and other elevated water tanks used for fire protection of buildings were found to have been affected so adversely that the Board of Fire Underwriters of the Pacific decided upon a state-wide survey of all sprinkler tanks under their jurisdiction. The resulting survey revealed alarming conditions. Serious hazards were found in so large a percentage of the structures examined that lateral weakness chargeable to either design, construction or maintenance could be said to be general.

In most cases the cost of remedial measures was not excessive. So successful were the discussions of the problems with owners that 85 per cent of all structures examined have been or are expected to be repaired or removed. In the following are set forth some of the essential findings and results of the survey.

The usual practice in automatic sprinkler protection of buildings is to provide two sources of water supply. The common combinations are gravity tanks and pressure tanks, city connection and pressure tanks, or city connection and gravity tanks. Gravity tanks resting on the building range from 15,000 to 50,000 gal. in capacity and are supported on structures of steel, reinforced concrete or (sometimes) wood; usually the tank bottom is about 25 ft. above the high point of the roof. Pressure tanks also are usually on the roof; they may be on the same structure as the gravity tank, near its base, or they may be separately located. Tanks on separate towers of steel usually are larger, 50,000 to 100,000 gal., and follow standardized design; the tank base usually is about 100 ft. above ground.

The behavior of elevated tanks in the Long Beach earthquake was disturbing. Several collapses occurred, and there were numerous instances of serious structural damage requiring immediate repair or removal. Each type of tank support showed more or less typical and characteristic weaknesses. Tall steel towers at Southgate, Lynwood, and one in Los Angeles, collapsed. Breakage or stretching of bracing rods in the steel towers was common; most frequently in the top panel and less frequently below. In some cases pins were pulled out of gussets, or rivets loosened or sheared. However, except where collapse occurred, the columns were not much affected, and the writer found no evidence of footing settlement.

In skeleton concrete towers, cracking of columns and of struts and platform beams was common, and remedial measures called for immediate unloading of the tank and ultimate removal of the towers or at least extensive reconstruction work. One low concrete tower supporting a small tank on the Press Telegram Building collapsed and thereby was responsible for the major portion of a $68,000 loss in this structure, which was of reinforced-concrete fireproof construction. Pressure tanks in general were not seriously affected other than by slipping in saddles and shearing of pipe connections.

The state-wide survey of elevated water tanks got under way in 1933, and the major portion of the work, whose results are discussed in the following, was completed about the end of 1934. It included structural analysis of 650 tank structures inspected in the field and

then analyzed in the office to determine resistance to lateral forces. Field work included complete measurements of the structure, noting of all structural data, and sketches of all connections and all important features; numerous pictures were taken, and where available original plans always were procured for checking.

Concrete tower deficiencies

That serious results would be disclosed was apparent from the very outset. In reinforced-concrete towers there were instances of changes in location or omission of struts, increase in height of tower or increase in tank size over that used in design. Obviously, the design in some cases had been changed during construction without permanent record of the changes.

Also there were evidences of careless workmanship: reinforcing bars exposed on the faces of concrete members, rock pockets, and pockets filled with sawdust and shavings in soffits of beams and girders. Over 75 per cent of all reinforced-concrete skeleton towers inspected were in poor shape. The concrete often was over-sanded, some had been poured very wet, and occasionally rock pockets extended halfway through columns. Most serious of all was the percolation of water through to the reinforcing bars, with resultant rust scale and spalling off of the protective concrete. Stirrups in beams and girders frequently were eaten away entirely, and some column reinforcing bars were found reduced to one-half original area.

Defects in steel towers

In steel towers corrosion was common in bracing rods, balcony girders and top flanges of beams and girders. Bracing rods frequently were loose and sagging; corrosion in angles and plates less than $\frac{1}{8}$ in. thick was particularly bad. In some cases rust formed under cover plates $\frac{1}{4}$ and $\frac{5}{16}$ in. thick had bulged the plates between rivets. Where the plates were $\frac{3}{8}$ in. or more thick, corrosion and rust formations generally were less serious. Many towers and platforms showed evidence of careless erection practice in riveting and bolting. Also, salvaged material had frequently been used. For example, buckled webs and crooked flanges caused by fire previous to erection were found. Also material buckled, bent and twisted during shipping or erection had been put in place without any attempt to repair it.

The stress analysis of each structure was made by the static method. To determine probable behavior in earthquake shocks a horizontal force of 10 per cent of the weight of the tank and contents was assumed, applied at the center of gravity of the tank. Towers of indeterminate type were analyzed by the Cross method of moment distribution. This method is practical and is not unduly tedious. Without this method, analysis of these structures by a so-called "exact" method would not have been practicable in the time available.

HORIZONTAL FORCES ASSUMED FOR TANK TOWERS

	Height (feet)	Founded on Firm Ground (per cent of weight)	Founded on Filled Ground (per cent of weight)
Towers standing on the ground.....	75 or more	10	12
	50 to 75	12	15
	Less than 50	20	30
Towers on or through buildings.....	Any height	20	30

Results of stress analyses

Results of these analyses checked closely with the damage observed in structures that had been subject to seismic shocks; in the tall steel towers of standardized design, rod breakage should have occurred in the top panels, where it did occur as noted in the foregoing. Similarly, the concrete towers behaved just as the analysis indicated they should. In short, it is the writer's belief that static analysis of structures such as those used to support elevated tanks applies quite accurately, and where intelligently followed in design will result in safe structures. It is his belief that the static analysis is no more inexact or illogical than dynamic methods: probably it is based on fewer assumptions; certainly it does not involve complex or questionable problems of similitude; and, most important of all, it fits the results of nature's shaking-table experiments on full-sized models.

The writer does not mean to infer that dynamic design attempts and shaking-table experiments are useless or should be discontinued. Their continuance is desirable, as some useful data have been and more may be developed. However, rather positive statements on the merits of dynamic and the dangers of static designs that have appeared in print are lacking in experimental and theoretical background and do not agree with the known facts of behavior in earthquakes.

There is much encouragement for the structural engineer in the fact that the few structures adequately designed to resist moderate horizontal forces came through the Long Beach quake and others without serious damage. This statement is fully supported by the results of the survey, for care was taken to make analyses in every case where a structure with seismic resistant qualities was found to have been subjected to lateral forces. One steel tank and tall tower in Long Beach, of standardized design but proportioned for a lateral force of 10 per cent the weight, was entirely undamaged in the shock of March 10, 1933.

The structural survey showed 95 per cent of all structures examined deficient in resistance to lateral forces. Bracing probably had the most outstanding defects. Short steel towers on buildings rarely were braced for wind loads of more than 30 lb. per sq.ft. reduced by 40 per cent on cylindrical surfaces. Connection details frequently were inadequate to develop the strength of the bracing; occasionally bracing was omitted altogether. Standard design in tall steel towers calls for bracing to resist a wind load of 30 lb. per sq.ft. reduced by 40 per cent on cylindrical surfaces. Many towers of this type were damaged seriously, and a few actually collapsed. Analyses of damaged structures whose failure was ascribed to bracing indicated that provision for lateral forces of at least 10 per cent of the weight would be necessary to safeguard against earthquake shocks. Unit stresses may be slightly increased over normal working stresses in applying these design considerations.

Concrete towers were found particularly deficient in bracing resistance. In most cases no provision was made in the column design for bending produced either by lateral forces or by dead and water loads; struts were inadequate in size and reinforcing, and platform framing likewise. Bar details often were poor. To sum up, analysis showed 98 per cent of the reinforced concrete towers to be so weak that the alarming record of structures of this type in the Long Beach area is understandable. The static analysis of structures as built indicated that just the sort of damage and failure could be expected that did occur. These results are so conclusive that the writer believes the practice of erecting skeleton concrete towers over buildings should be discontinued.

Remedial measures

In formulating a program of remedial measures three major elements were considered and correlated: the behavior of towers that had been subjected to earthquake shocks, conditions observed in the course of the field inspection, and weaknesses disclosed by the theoretical analyses. Two objectives were set up: (1) safety to life and property by preventing collapse and (2) minimizing damage and maintaining water supplies by preventing or minimizing pipe breakage.

In setting up the requirements to be met by the remedial measures both in repair and in new design, certain assumptions had to be made as to the lateral forces to be resisted safely by the strengthened or reconstructed structure. These assumptions are indicated in Table I. In applying them, the unit stresses were increased from 20 to 33⅓ per cent, depending on the item involved.

The weight percentages fixed in the table apply to weight of tank, platform

and water. In general, the lateral force was taken as acting at the center of gravity of the tank. Reasons for the higher coefficient in the case of tanks on buildings are that (1) the motion of such tanks may be exaggerated by movement of the building itself, and (2) collapse of such a tank might wreck a building, with resultant loss of life.

If these factors are thought to be high it is to be remembered that instances of earthquake damage were found in all types of tower examined. Design and repair requirements of necessity had to increase the strength, particularly in those parts where failure occurred. Applying these coefficients to tall steel towers of standard design will result in increasing the strength of bracing rods in the top panel by 300 to 500 per cent. Column strength also is increased. In the case of the average short tower on a building the bracing strength is increased 200 to 400 per cent.

Very special care was taken to secure stiff, strong connection details. Electric arc welding made possible the extensive repair and reinforcing involved and also is acceptable in new construction. Shielded welding rod is required.

Earthquake ordinances adopted by several cities in southern California after the Long Beach shock require tank towers to be designed for a lateral force of 20 per cent of the weight, in the belief that safeguard against earthquakes more severe than the Long Beach quake is necessary. The Long Beach shock was not notable in either energy, duration or amplitude of motion; more severe shocks have occurred before and may occur again. Therefore, attempts to formulate requirements barely adequate for safeguard against a shock of this particular magnitude are not desirable.

During the progress of the repair work several new details of bracing and tank mounting particularly effective for work of this sort were developed and used successfully.

Success in interesting owners

The survey and analysis made by the Board was not considered complete until each owner was contacted personally and by letter for a complete presentation of the conditions affecting his structure. Compliance with suggestions for repair or removal was not mandatory and there was no penalty for non-compliance. The program, rather, was to convince the owner of earthquake hazard in general and of the particular hazard involved in his own structure. Beyond this there was simply the suggestion that he should perform the required repairs for his own protection.

Particularly gratifying success has attended this program. More than 60 per cent of all major tank structures in the more hazardous zones already have been repaired or removed and work is still progressing rapidly. Probably more than 85 per cent of all structures examined eventually will be repaired or removed. Many of those on which no work has been done are located on the ground and away from buildings, so that the hazard to life is low. The coefficients given in Table I were found entirely practical and not unduly expensive in this repair work. The cost per tank ranged from $600 to as high as $15,000, with an average between $1,000 and $3,000.

Removal of skeleton concrete towers and of tanks on brick walls was urged in all cases, and any attempt at repairing such construction was discouraged. Removal of gravity tanks was suggested wherever it was feasible to provide an acceptable substitute supply, such as a city connection.

The field survey and analysis of elevated tanks has been carried on by the sprinklered risk department of the Board of Fire Underwriters of the Pacific, of which Gardner A. Russell is secretary and R. M. Coon is chief engineer. The detail investigations and supervision of the repairs were handled largely by M. K. Rouse and L. E. Morrison for the department. J. E. Shield and the writer, as structural engineers for the board, were responsible for structural analysis, formulation of engineering design requirements, checking plans for new designs and repairs, and inspection of field work.

Diesel Power Plant

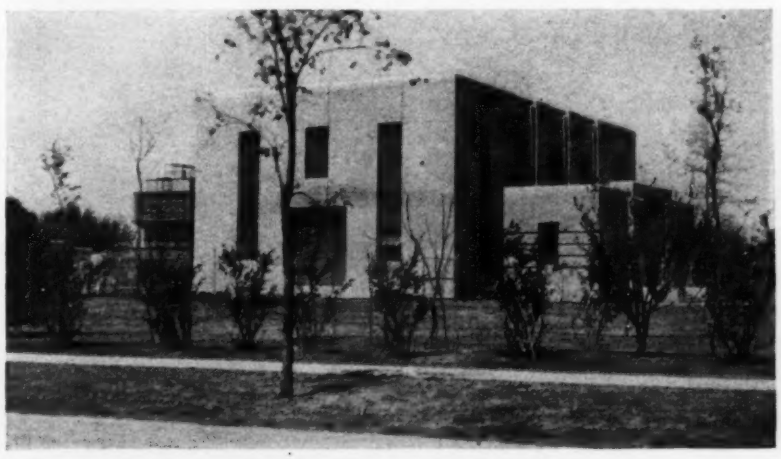
Using PWA funds, Cushing, Okla., has built a municipally owned power plant utilizing diesel engines that are supplied with oil from refinery across the street—An unusual cooling water system employed

AFTER FIVE YEARS of controversy with the local power company, Cushing, Okla., has built a power plant of its own which was put into service in January. Factors of interest in this 1,500-kw. diesel plant are as follows: Two kinds of water are utilized in the cooling system, hard water from the city well supply which is pumped from a cistern to the top of the cooling tower where it drops over heat exchangers on another closed system within which is soft rain water passing through the engine jackets. The engine exhausts are passed through a waste-heat boiler which also acts as a muffler. The building has no exhaust stack in sight, exhaust gases being passed up to the roof level through the exterior wall pilasters.

The plant which the city has built consists of three vertical 6-cylinder, four-cycle, single acting diesel engines each having a capacity of 750 bhp. and a speed of 225 r.p.m. Each drives a 500-kw., 2,300-volt, three-phase, 60-cycle alternating current generator. The fuel oil consumption of these three engines has been found to be unusually low. The guarantee of the manufacturer was 0.37 lb. of 19,000 B.t.u. oil per bhp.-hr. A 12-hr. full load test was made on each of the engines and the average for the three engines was 0.3483 lb.

Instead of the usual exciter for each generator driven from the shaft of the engine, excitation is furnished by independent motor-generator sets, one of 50-kw. capacity, the other of 30-kw. capacity. The 30-kw. unit has an extended shaft on which is a 50-hp., 6-cylinder gasoline engine. This gasoline engine will start the generator through a clutch when the

A MODERNISTIC BUILDING houses the municipal power plant at Cushing, Okla.



plant is shut down, in order to provide excitation for one of the main generators. When the main generator is running the clutch is released, the engine shut down, and the power for the motor-generator set is taken from the main generator.

Cushing is in the middle of one of the older Oklahoma oil fields. Directly across the street from the power plant is an oil refinery which furnishes the fuel oil for the engines, oil being piped from the refinery to two underground 15,000-gal. steel storage tanks, protected on the outside by concrete. Hot water coils connected to the circulating water system of the plant heat the oil. A motor-driven centrifuge transfers the oil from the underground tanks to a 2,000-gal. tank in the basement of the power plant and at the same time removes any impurities. An automatic motor-driven pump lifts the oil to the day-storage tank, from which it flows by gravity through three separate lines to the three engines. A meter is installed in each of these three lines. An emergency motor-driven fuel oil pump is provided which can pump oil from either of the underground tanks or from the basement tank to the day-storage tank or to the engines. On each cylinder of the engines is installed a pressure pump operating from the governor of the engine, and the flow of the oil is controlled according to the speed of the engine.

A second centrifuge purifies the lubricating oil so that it may be used over and over again. Three lubricating oil tanks are located in the basement between the foundations of the engines, each tank divided into two compartments. The piping is so arranged that the centrifuge can take the oil from any compartment of the tanks, purify it and pump it back into the alternate compartment.

In the basement are three air tanks for starting the engines and an air compressor driven by a direct-current motor which receives its power from the motor-generator sets. The tanks are connected to a header system so valved that any one of the three engines can get air from any one of the three tanks.

A cistern located outside the building collects rain water from the roof of the building. This soft water is pumped through the engine jackets and on out through heat exchangers located in the lower part of the cooling tower, thence back to the cistern. City water is pumped to the top of the cooling tower. The water then drops down over the heat exchangers, is collected in a concrete basin in the bottom of the cooling tower and is recirculated continuously. Any loss is made up from the city water system. The cooling tower itself is of the vertical-louvre type. It is designed to harmonize with the modernistic power plant building.

The exhaust pipe from each engine is taken down to the basement where a thimble-tube type waste-heat boiler is installed, one for each unit. In the winter time these waste-heat boilers provide low-pressure steam for heating the building, through unit heaters placed on the walls. At all times they serve as mufflers for the exhaust.

From the waste-heat boilers the exhaust pipes are carried into the basement walls and are turned upward and carried to the top of the building inside the heavy pilasters of the exterior walls. An air space is left around each steel stack and screened openings through the brickwork at the base of the pilaster provide for an upward air flow between the steel stack and the brick. These stacks were designed to minimize the vibrations and noise from the engine exhausts and are so successful that no noise can be heard outside the building.

The switchboard is a steel dead-front type equipped with automatic solenoid-operated circuit breakers controlling all feeder circuits. There are thirteen panels, with two added for future use, and one overhead swinging bracket.

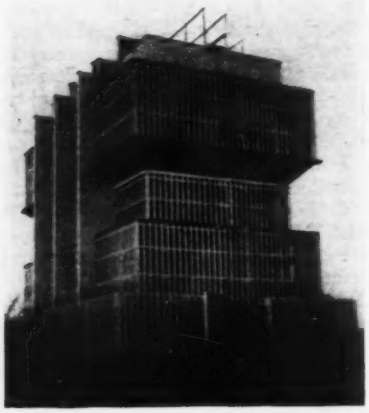
In the basement are the street lighting transformers. They are controlled from the switchboard. Two other transformers supply the necessary power for station use, one a duplicate for emergency. Constant average frequency is maintained by an electric clock.

The power lines leave the building in underground conduits. Lead-sheathed cables are laid in fibre ducts, and the ducts are encased in concrete. These lead to the overhead distribution system, the take-off poles being across the street. The distribution system is a three-phase system with seven circuits which can be sectionalized into any number of circuits desired.

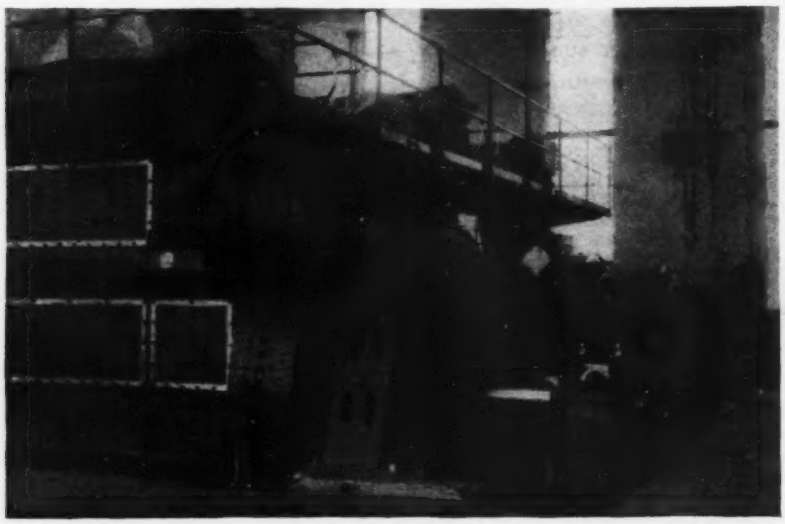
The number of customers now served is 2,010, with applications from more. The city has taken over 80 per cent of the load which the utility previously carried.

The total construction cost of this plant and distribution system, $350,000, was financed by a PWA loan and grant. The work was divided into four contracts. The power plant building, cooling tower, garage-warehouse, grading and landscaping, and engine and auxiliary foundations were constructed by the Charles M. Dunning Construction Co., of Oklahoma City. Mattison-Wallack & Co., Oklahoma City, furnished and installed the three diesel oil engines together with necessary auxiliary equipment. P. E. Workman, Dallas, Tex., built the switchboard and motor-generator sets; and Mattison-Wallack built the distribution system.

THE COOLING TOWER is designed on modernistic lines to harmonize with the power house.



THREE 750-HP. DIESEL-ELECTRIC GENERATORS have been installed in the Cushing plant and space is provided for a fourth unit.



Personnel

The plant was designed and construction supervised by W. R. Holway, consulting engineer, Tulsa, Okla. O. W. McDaniel was resident engineer. J. W. Flint is the city manager of Cushing, and largely responsible, with the city commission, for the building of this plant.

FIG. 1—THE BRIDGE across the Delaware River between Philadelphia and Camden over which rapid transit train operation begins this week.

Rapid Transit Begins Across Philadelphia-Camden Bridge

New rail line follows new subway routes in Camden and Philadelphia and crosses suspension bridge on existing cantilever brackets outside stiffening trusses.

By **Laurence B. Manley and Stephen Harris**

Office Engineer and Engineer of Design
The Delaware River Joint Commission
Camden, N. J.

THE TWO-TRACK railway for multiple-unit electric train service between Philadelphia and Camden, over the Delaware River suspension bridge known as the High Speed Rail Transit Line was turned over to the Philadelphia Rapid Transit Co. on May 11 for preliminary operation and instruction of trainmen after being constructed and completely equipped by the Delaware River Joint Commission of Pennsylvania and New Jersey. It will be opened for revenue operation next Sunday, June 7.

The line, about 2.68 miles long, extends as a subway from a connection with the Philadelphia city-owned subway in Eighth St. to the Delaware River Bridge, and thence over the bridge to the Camden approach, where it again enters the ground and continues as a subway to its terminus adjacent to the Broadway station of the Pennsylvania - Reading seashore line railway. Building the subways constituted the principal construction operation since the brackets outside the stiffening trusses of the bridge which support the line across the river were built with the bridge in 1926. The running time of trains from Market St., Philadelphia, to Broadway, Camden, will be 9½ min. More convenient means of access to the Broadway station of the Pennsylvania-Reading seashore line will be provided, and quicker transportation between Camden and the heart of Philadelphia and much needed relief from the extreme bus congestion in the Philadelphia streets will be afforded by the new facilities.

Authority for building this line was given to the Delaware River Joint Commission by the legislatures of Pennsylvania and New Jersey in 1931. The preliminary plans were prepared by the commission's chief engineer, Ralph Modjeski, and were approved by the commission on Jan. 20, 1933. In October of that year, Modjeski, Masters & Chase were appointed engineers for the project. Bids for the first construction contract in Philadelphia were received on Jan. 15, 1934, and ground was formally broken for the construction on Feb. 23, 1934.

The commission first attempted to finance the construction of the project through private bankers but without success, due to the condition of the bond market at that time, and as an alternative secured the approval on Nov. 29, 1933, of a PWA loan of $10,000,000 and a grant of $1,900,000. The loan and grant agreement was finally executed on May 4, 1934

After construction started, the improved condition of the bond market and the commission's high credit rating permitted the sale of $7,158,000 of bonds to the public at a considerable premium, the last block of $500,000 of 4¼ per cent bonds being sold on April 17, 1936, at 113.816. The grant has been drawn upon as warranted by current expenditures but only one block of $400,000 bonds has been sold to the government.

On June 15, 1934, a lease with the Philadelphia Rapid Transit Co., operators of the Philadelphia subways, was signed for the operation of the line. A fare of 10c. will be charged, the commission to receive 2½c. for each passenger crossing the bridge. Passengers from Camden will pay the regular 10-c. fare and will be entitled to free transfer and exchange privileges to the Eighth-Broad St. city-owned lines in Philadelphia. Until the Locust St. subway is put into operation, they will also receive the same privileges on the Market St. subway. Eastbound passengers from Philadelphia will pay the regular 7½-c. fare and in addition an extra 2½-c. fare upon leaving the Camden stations. Passimeters operated by a special token larger than a 5-c. piece are installed for this purpose. Considerable thought has been given to the size of the various tokens. The 2½-c. passimeters will operate from a token and a nickel but this token will not operate telephone pay stations. The 7½-c. passimeters will operate from a token and a dime. The 10-c. passimeters will operate from a dime only.

Route followed

Trains from Philadelphia will leave from the island platform of the Market St. station of the Eighth St. subway and will branch off at Race St. into the new structure. Trains from Camden will arrive at a low level undercrossing at Race St., pass under the Eighth St. subway tracks to avoid a grade

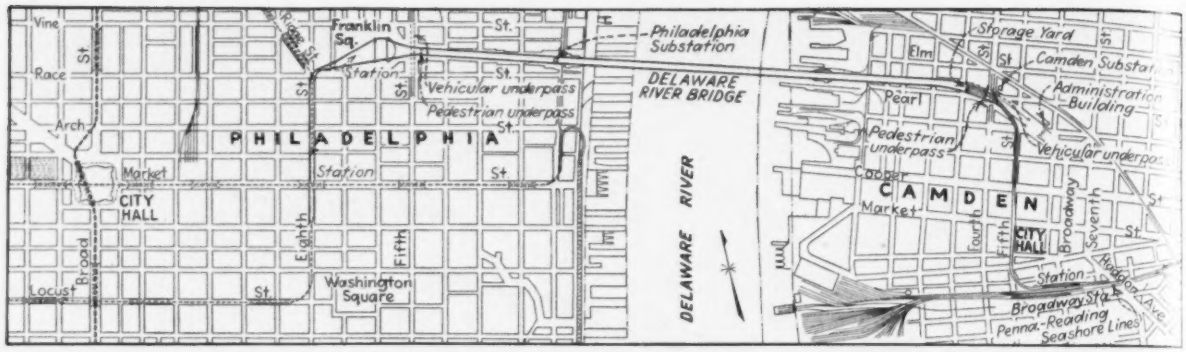


FIG. 3—PLAN of Philadelphia-Camden rapid transit line. Philadelphia terminus is at Eighth and Market Sts. until city opens its Locust St. subway.

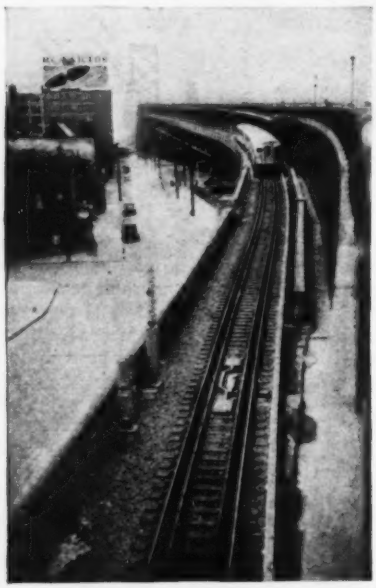


FIG. 2—TRAIN approaching Camden subway from Delaware River bridge whose towers are in the background.

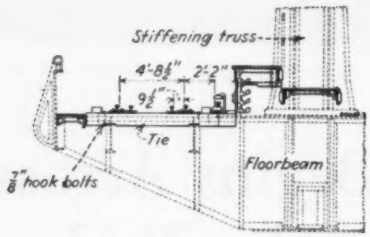


FIG. 4—TRACK construction on the spans of the suspension bridge.

crossing, and reach the Market St. station by way of a third track in the Eighth St. subway. This undercrossing and provision for the third track were constructed by the city of Philadelphia at the time this subway was built, the city afterward being reimbursed by the commission.

From Eighth and Race Sts., the line extends in two single-track tubes through private property taken by the commission, then through Franklin Square, where a station is located, to the substructure of the Delaware River Bridge approach; it crosses the bridge in two outside locations the steel framework for which was provided in the original bridge construction (Fig. 4). On the Camden side the tracks converge below the approach structure and turn southward into Fifth St. in a two-track subway. The City Hall station centering on Market St. is located in Fifth St. At Federal St., the subway swings eastward through what was formerly private property to a location parallel with and adjoining the tracks of the Pennsylvania-Reading seashore line and terminates in a station centering on Broadway. Beyond this point is a continuing approach passageway at the street level leading to Haddon Ave.

The maximum grade on the line is 5 per cent, and the minimum radius of curvature 200 ft., except in the Camden car storage yard where 168 ft. radius is used.

Stations and underpasses

The three passenger stations have 550-ft. platforms. In the Franklin Square and City Hall stations the walls are tiled with a non-absorbent vitreous tile, while faience tile is installed at the Broadway station. The tile, fences, columns, and equipment are of a distinctive color for each station, green for Franklin Square, blue for City Hall, and buff and black for Broadway station, combined with aluminum at the street level.

The Franklin Square station has two side platforms with a connecting mezzanine for station control equipment. The City Hall station and the Broadway station have center platforms with an overhead mezzanine, that at the Broadway station being at the street level. Numerous passageways and stairways afford convenient access to the street. On both sides of Broadway attractive buildings have been constructed for entrance and exit purposes and station control equipment. These are provided with entrances at the street level and are reached from the platform below through fixed stairways and by a 4-ft. reversible moving stairway. At the east end of the station heated quarters are provided for the subway operating force.

The subway structure crossed an old vehicular underpass in Fifth St., Philadelphia, at grade and also created a barrier across Fourth St. in Camden, and new underpasses were required to be constructed in these streets. The Fifth St. underpass in Philadelphia is for northbound traffic only and is approximately 1,450 ft. long with an approach grade of 6 per cent and an ascending grade of 5½ per cent. A trolley line in Fifth St. has been diverted to the new underpass. Upon the completion of the new underpass, the original underpass in Fifth St. was abandoned, and the ramps filled in and paved over.

The Fourth St. underpass in Camden is for two-way traffic. It is not required to be as deep as the one in Philadelphia and is only 650 ft. long. On account of limiting street connections at both ends, the approach grades are 7½ per cent. A short underpass alongside, reached by stairways at either end, provides for pedestrian travel.

The Philadelphia underpass required the widening of Fifth St. for a considerable distance on the east side, and in Camden both sides of Fourth St. were set back, requiring in both instances the acquiring of private property and the demolition of numerous buildings.

Design features

Both the subway and underpass structures of the line are of the usual steel frame and concrete jack-arch construction similar to subways in Philadelphia and New York. The steel frames are spaced 5½ ft. on centers and in general have a depth of concrete at the crown of the roof arches of 9 in. and are 11 in. thick at the center of the side wall arches. The roof is waterproofed with a 3-ply fabric laid in asphalt, protected with 3 in. of concrete. No waterproofing of the floor and side walls has been attempted. However, for the subway in Camden a 1:2:3 concrete has been placed in the floors and side walls to secure a dense waterproof mixture. Also on account of much silt and fine sand in Camden, this subway was re-

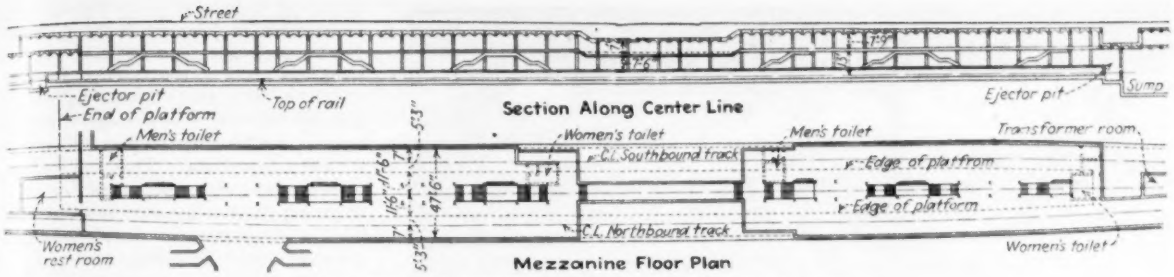


FIG. 5—STATION facilities provided at the City Hall stop in Camden.

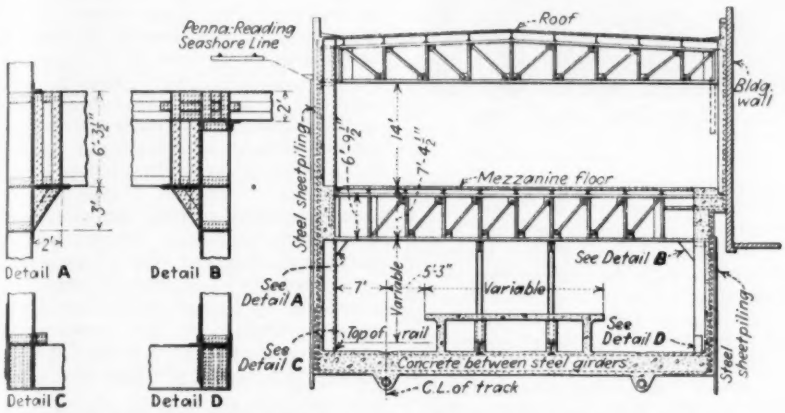


FIG. 6—RIGID FRAME construction at Broadway station, Camden, required for the support of railway embankment and tracks on one side only.

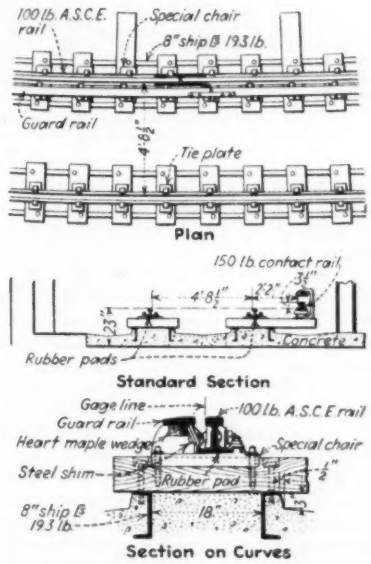


FIG. 7—SPECIAL track construction involving channel supports, used on curves and at other points where track must be held rigidly in place.

quired to be constructed between continuous lines of steel sheet piling. The level of the ground water is well above that of the subway floor and the subway drains are of cast-iron pipe with lead joints, to prevent the infiltration of outside ground water.

An unusual feature of the design was provided at the Market St. crossing of the subway station with the object of keeping the tracks at the highest possible level and still permit a sewer and other underground conduits to pass over the roof. To accomplish this the station mezzanine was ended at either side of Market Street, and a connecting passage 8 ft. wide was constructed over the center platform below. By dropping this passage to a clearance of 7½ ft. above the station platform and by constructing the thin roof and floor that this comparatively short span permitted, an extra amount of space for underground structures of about 4 ft. was obtained.

The construction of the Broadway station in Camden required special treatment both in the design and the construction for the maintenance and safety of the adjacent railway tracks. The subway tracks are 21 ft. below the surface, the floor of the mezzanine structure for station control is at the street level, and the railway tracks are 19 ft. above the street level on an earth embankment. The south subway wall extending upward as the wall of the mezzanine is required to support the railway embankment with no compensating reaction on the north side of the subway structure, the original stone retaining wall having been removed during construction. To provide for these conditions, a special rigid frame subway construction was designed as shown on Fig. 3. The thrust from the embankment is cared for by deep trusses located just below the mezzanine floor, by girder beams below the track, and by very heavy connections to the vertical members of the frame. Above the mezzanine trusses the embankment thrust is carried by a cantilever construction of steel beams and concrete.

Track work

To match connecting tracks in the Philadelphia subway, the track of the High-Speed Line consists of 100-lb. A.S.C.E. rail laid to standard gage, and a 150-lb. top-running contact rail on porcelain insulators with protection boards, all laid on creosoted yellow pine ties. The track over the bridge is provided with 100-lb. A.S.C.E. emergency guard rails throughout. In the subway the ties are short blocks beneath each rail, and are either embedded in concrete or bolted to the top flanges of steel channels embedded in concrete. The channel construction, which is standard in the Philadelphia subways, was adopted at curves and for special work with the object of holding the track rigidly in place and providing a convenient method for the replacement of ties. Across the bridge the ties on the approaches are of standard length laid in ballast on a concrete slab. Over the suspended span, regular bridge construction is employed consisting of 8x10 in. ties bolted to the steel frame provided in the original bridge construction. Longitudinal guard timbers bolted to the ties are provided over the suspended span.

Tie plates, used throughout the work, were accurately fitted to the ties in the shop and provided means for the subsequent placing of the running rail on rubber pads, in accurate alignment. The rail is fastened to the tie plates by means of clips, thus providing for replacement with a minimum damage to ties. This construction eliminates the necessity for anti-creepers. Fig. 2 shows these tie plates in connection with the channel type of track construction.

Expansion joints of a new and effective design providing for a movement of 19 in. have been installed in the tracks at the bridge towers.

The signal and interlocking equipment is of the electro-pneumatic type similar to that of the Broad Street subway. The compressed air is supplied from two compressor plants located in

FIG. 8—EMERGING from the Camden subway onto the bridge approach. The trackage in the center is for car storage.

the Franklin Square and City Hall stations. An innovation consists in the installation of air lines of thin wall bronze tubing.

Twenty-six steel passenger cars having a modified streamline outline at the ends, a seating capacity of 67 passengers and a total capacity of 225 passengers are being used. The cars are 10 ft. wide and 67½ ft. long and weigh about 113 lb. empty. On account of the heavy grades on the bridge which reach a maximum of 5 per cent the cars are provided with motors on each axle of both trucks, and each car is capable of moving a heavily loaded disabled car over the maximum grade. An innovation in connection with the power supply is the placing of all conduits outside of the subway, with connections made into the subway at suitable points. This arrangement was chosen to minimize the danger of panic arising from smoke coming from burned out cables.

Construction details

The construction of the subway and underpasses was carried on in three contracts: Contract No. 1, all work in Philadelphia, by Builders, Inc.; Contract No. 2 in Camden, covering bridge alterations, underpass construction and subway construction in Fifth St. to the north side of Market St., Marcus Contracting Co., Inc.; Contract No. 3, covering the remainder of the line in Camden and including the construction of the Broadway station and the support and protection of the adjacent railway tracks, Triest Contracting Corp. In addition, the concrete deck on the bridge approaches for the support of the ballast and track was constructed by Turner Construction Co.

Contract No. 1 presented few construction difficulties since the work was largely carried on in Franklin Square and in locations where buildings had been demolished, so that only a small amount of decking was required. The excavations were braced by means of H-section piles driven in advance of the excavation; horizontal wooden louvre boards were placed to bear against the flanges as excavation progressed. This construction provided a free space between side walls for the removal of the excavation. Careful work was required in cutting out the side and portion of the roof of the Eighth St. subway for connection with the new line and in supporting the bridge approach structure for the underpass construction.

Contract No. 2 comprised extensive alterations to the Camden approach structure of the Delaware River Bridge, to bring the tracks together, and extensive underpinning operations both in connection with the subway construction and that of the Fourth St. underpass. This has been described in a previous article (*ENR*, January 2, 1936). The subway construction in Fifth St. under this contract, as has been previously noted, was made between continuous lines of steel sheetpiling. The soil was dewatered by means of well points, and the excavation under these conditions was removed without difficulty. The construction of the Fourth St. underpass, except for the methods required for the support of the bridge structure overhead, involved only routine work.

The concrete side wall jack-arches above the floor level of the subway were required to be poured in one operation. To furnish adequate support for the steel sheet piling, longitudinal steel and concrete wales firmly braced against the subway side wall columns permitted the removal of interior braces interfering with the concreting. The steel and concrete wales were left in place. Construction joints in the subway were made midway between the steel bents in order to minimize leakage.

Contract No. 3 included the construction of a short section of subway, the Broadway station, and the support and protection of the railway tracks on the adjacent high embankment. It also included the construction of the passageway to Haddon Ave. Careful preliminary preparations involving the use of pre-driven steel girder beams (known on the work as soldier beams) for the temporary support of the banks and adequate steel struts and timber bracing where required enabled the contractor to carry through the construction with safety and dispatch. The groundwater was found not to be excessive and was cared for by French drains below the invert. Details of the construction operations were covered in the October, 1935, issue of *Construction Methods*.

Supervision and personnel

Approval of contracts, plans and specifications was under the direction of Maj. Wm. H. Gravell, first as PWA state engineer, and afterwards as acting state director, PWA, up to the date of his retirement March 1, 1936. Capt. G. Douglas Andrews was appointed state director but due to his illness, H. P. Hevenor, as acting state director, has been in charge since March 24, 1936. John L. M. Yardley is state engineer inspector, PWA.

The project has been designed and constructed under the supervision of Modjeski, Masters and Case, Inc. Clement E. Chase directed the early design studies, but since his untimely death, resulting from a fall from the bridge just before the work was started, the project has been directed by Montgomery B. Case.

Plant Modernization Progress Revealed in FHA Survey

INDUSTRY'S answer to the need of modernizing plants and replacing obsolete machinery and equipment is shown in a breakdown of the records of the Federal Housing Administration. Leading all other classes of business using insured modernization credit, industrialists have borrowed about 30 per cent of all of the Class A funds extended by banks, trust companies and other financial institutions. Some 45 per cent of the money so borrowed has been spent on building alternations, repairs and extensions, and 55 per cent on new machinery and equipment. Class A loans are chiefly for improvement of income-producing properties. It is stated that interviews with operators, contractors and engineers indicate that the expenditures have brought better business in some instances. In other cases plant efficiency has been improved considerably.

Die Cast Asphalt Pipe Joints

Jointing difficulties on vitrified pipe in wet trench overcome by precasting asphalt joints in the field for Milford, Mich., intercepting sewer

By G. E. Hubbell
Wayne University, Detroit, Mich.

DURING CONSTRUCTION of a 21-in. vitrified-pipe intercepting sewer for Milford, Mich., attempts to follow specifications for hot poured joints proved unsuccessful because of the wet trench in which the sewer was to be laid. The sewer parallels the bank of the Huron River and a greater part of the line is below river level. Because of the conditions surrounding the job it was not practical to unwater the trench with well points. When construction was first started under CWA an attempt was made to follow the specifications which call for a hot poured joint, but because it was impossible to entirely unwater the trench, the jointing compound would not seal at the invert of the pipe. As a result a cement oakum sodded joint was tried, but the results were still unsatisfactory as considerable time had to be spent in caulking the completed portion of the sewer from the inside in order to cut down the high rate of infiltration.

Later, construction was taken over by the WPA and, as a result of tests conducted at Wayne University, field-made die cast joints were used. Although this type of joint had been used on other sewer work, the usual practice was to have the pipe prepared at the factory and shipped to the job with the joint in place. As this required careful handling of the pipe during shipment it was decided to cast the joint at the job site.

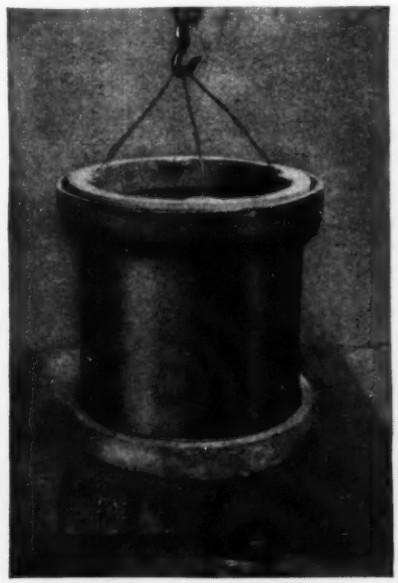
Laboratory tests of joints

The tests at Wayne University were made on 6-in. pipe to determine whether the joint would resist external or internal application of pressure immediately on being formed in the trench, and whether the joint would heal under wet trench conditions. Cast iron dies were used in forming the joints, a collar being poured around the spigot and a similar collar inside the bell. The material used for the joint was a mixture containing 40 per cent asphalt and 60 per cent silica by weight, the silica being added slowly to the boiling asphalt. After several days the formed surfaces were painted with a naphtha cut-back asphalt paint and sections of the pipe were joined. Immediately after the joint was formed, two plugged lengths of pipe were subjected to an internal water head of 3 ft., causing the spigot to be forced out of the bell. To test the joint under external pressure, which is normal under field conditions, the joint was subjected to an external water head of 6 ft. and under these conditions the joint was found tight and satisfactory. Spigots inserted into bells under water, healed in four hours to form a strong joint. These findings were subsequently verified in the field.

Set-up for field casting

For casting the joints on the job, a level platform was constructed and the spigot-end die was bolted to this platform. A chain fall was rigged up over the platform to set the pipe in place and to handle the bell-end die. The asphalt was heated in an open kettle to a temperature just below that at which yellow smoke is given off, the silica was then stirred in to form the jointing compound. In order to prevent the compound from sticking to them, the dies were painted with a mixture of silica and water and allowed to dry. The mixture was then poured between the pipe and the dies and allowed to cool. Once the joint has been cast and the dies removed, moderate care must be exercised to prevent damage to the spigot collar.

On this job two men cast an average of twenty joints per 7-hr. day, and a large part of their time was consumed in bringing the compound to the required heat and in allowing the dies to cool. Three men working with two sets of dies could, in all probability, cast more than 40 joints in a 7-hr. day, as it would then be possible to cast joints for two lengths of pipe at each heating of the compound.



PLATFORM AND DIES for field casting of asphalt pipe joints. A chain fall is used to place the pipe in the spigot-end die and to place the bell-end die.

Before laying the pipe the trench was excavated slightly below grade and sand was then tamped under the suspended pipe in order to obtain the required grade. At no time during excavation was any attempt made to pump out the ground water. The water was allowed to drain back into the completed portion of the sewer and sand was prevented from being carried back by suitable dams in the trench and in the sewer. At times, crock were laid in 12 in. of water and in all cases satisfactory joints resulted.

Pipe specifications

In specifying vitrified sewer pipe on which this type of joint is to be used, special emphasis must be placed on the furnishing of pipe of uniform diameter. Chipping of the spigots to allow casting of the joints on poorly formed pipe should not be allowed. Specifications for this particular job permitted the furnishing of pipe with a variation in the annular space between the spigot and bell of from $\frac{1}{4}$ in. to $1\frac{1}{4}$ in. The suggested minimum width of annular space in order to obtain a satisfactory joint is $\frac{3}{4}$ in.

Spun concrete pipe may be used with this type of joint if the spigot and bell are painted with cut-back asphalt prior to the casting of the joint. Without this treatment the jointing material will not adhere to the pipe.

Cost comparison

Die cast joints can be used advantageously when it is desirable to reduce the cost of pumping under wet trench conditions and in reducing the amount of labor necessary for forming joints in the trench. For the prevention of infiltration of water and entrance of roots into the sewer this type of joint has proved highly satisfactory. On the Milford sewer job labor and material costs of the cast joint compared favorably with the cost of sod cement oakum joints under the difficult conditions as can be seen by the following cost comparison:

Die Cast Asphalt Joints	
Labor—2 men—14 hr. at 50c—at 20 joints per day	35c
Material—10 lb. of compound at 3c, including rental of dies	30c
Equipment—Hoist, kettle, fuel	5c
Cost per joint	70c
Sod Cement Oakum Joints	
Labor—2 men—14 hr. at 50c—at 20 joints per day—mixing mortar, cutting sod, etc.	35c
Material—cement, sand, oakum	25c
Cost per joint	60c

The project was designed, and the construction supervised, by Hubbell, Hartgering & Roth, Inc., consulting engineers, Detroit, Mich. The cast joints were developed by the Gladdens McBean Co., Seattle, Wash. Until the present time the use of this type of joint has been limited to the Seattle district and it has come to the job cast onto the pipe by the manufacturers.

Indeterminate Truss Design Methods Simplified

Cut-and-try preliminary design with assumed areas and lengths of members eliminated in favor of a direct solution

By Albert Haertlein
Associate Professor of Civil Engineering Harvard University, Cambridge, Mass.

FRAMED structures such as continuous trusses and arches whose reactions cannot be found by the application of the laws of statics alone have been generally analyzed by supplying additional equations derived either from the "principle of least work" or from the "principle of virtual work." These equations supply elastic conditions which need to be fulfilled. A simple illustration—a continuous truss over three supports whose reactions pass through pins and all but one reaction on rollers, or a two-hinged framed arch—will show that both principles give identical final expressions for the unknown reaction components. A study recently made indicates that an approximation of this expression can be used in finding the unknown reactions without first making preliminary designs on the basis of assumed lengths and areas of members. The possibilities of this procedure in reducing design time and difficulties recommend it for consideration.

Final expressions for unknowns

Let X represent the magnitude of the vertical component of the center reaction of a two-span continuous truss or the horizontal component of the reaction of a two-hinged framed arch as shown in Fig. 1. Also:

Let s = stress in each member of the frame due to all vertical loads and the vertical reactions caused by these loads without including the stress caused by the force X. These stresses can be found by the application of the equation of statics.

t = ratio of the stress in each member caused by a unit force applied at the point where the force X is applied and in the same direction as X, divided by the unit force.

A = area of the cross-section of each member.
L = length of each member.
E = modulus of elasticity of each member.

Then

Xt = stress in each member due to the force X.

The principle of least work states that the total internal work or total external work (both being equal) is a minimum consistent with equilibrium. An expression for the total internal work would be

$$W = \sum \frac{(s + Xt)}{2} \cdot \frac{(s + Xt)}{AE} L,$$ the

summation being for all members of the frame. To find the minimum, differentiate with respect to X and set $\frac{dW}{dX}$ equal to zero, or

$$\frac{dW}{dX} = \sum \frac{stL}{AE} + X \sum \frac{t^2 L}{AE} = 0$$

$$\text{from which, } X = -\frac{\sum \frac{stL}{AE}}{\sum \frac{t^2 L}{AE}}$$

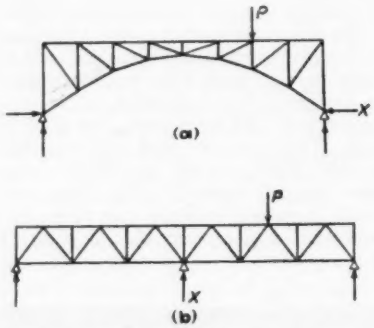


FIG. 1—LINE DIAGRAMS of a two-hinged arch and a continuous truss.

The principle of virtual work enables us to find the movement of any point of a frame. If the structure be made statically determinate either by removing the center support of the two-span continuous truss or by placing the right support of the two-hinged arch on rollers, an equation expressing the vertical movement of the center support of the continuous truss or the horizontal movement of the arch may be written. The total movement caused by all the forces, of course, is zero. Using the same notation as above, this equation becomes

$$\sum \frac{stL}{AE} + X \sum \frac{t^2 L}{AE} = 0$$

$$\text{from which, } X = -\frac{\sum \frac{stL}{AE}}{\sum \frac{t^2 L}{AE}}$$

These principles are fully discussed in numerous textbooks on statically indeterminate structures and so need not be elaborated upon.

A designer must determine the value of X for any condition of loading in order to find the maximum stress in each member for the purpose of selecting its size and shape. The influence table or influence diagram is a useful device for finding the position of loads to cause the maximum effects. The values in such a table or ordinates in such a diagram give the value of a function, such as the stress in a member, for a single load of unity placed at a definite point, base of the ordinate. To find the stress in a member, the structure is imagined to be cut into two separate parts, the cut including the member whose stress is desired. If the structure as a whole is in equilibrium, either part must be in equilibrium under the action of the loads, reactions and the stresses in the cut members. Consequently the equations of statics may be applied to the forces acting on either part of the structure. Since one or more of the forces on either side of the section may involve the force X, it becomes necessary to determine the value of X for various positions of the loads. So it is desirable to prepare an influence table or influence diagram for X.

Assumptions present a dilemma

Since $X = -\frac{\sum \frac{stL}{AE}}{\sum \frac{t^2 L}{AE}}$, it is evident that before X can be determined, it is necessary not only to know the geometrical outline of the structure, which determines the L or length of each member, but also to know the A or area of the cross-section of each member. Since the area is what is ultimately desired, a dilemma confronts the designer. In order to find the area, the area needs to be known before it can be found. The procedure outlined in textbooks, other literature, and office practice with which the writer is familiar, requires that in some manner a preliminary design be made on the basis of assuming the structure to be something different from what it is. For continuous trusses, a preliminary design is made on the basis of a continuous beam of constant moment of inertia. By the application of Clapeyron's three-moment equation or Professor Cross' method of moment distribution, the reactions are readily found. For framed arches the horizontal components of the reactions are generally found by using an approximate formula for the determination of the horizontal component of a solid flat parabolic arch. Having thus found an approximate area, the true values of X can be found from the foregoing expression. From this the maximum stress in each member can be determined and a new area found. If the difference between the area thus

determined and the preliminary area used is too great, the process needs to be repeated, using the last area determined until the final areas agree reasonably well with the areas used in getting them.

It is evident that the crux in the solution of these statically indeterminate frames is in guessing the areas used in the calculations to find the areas. The arithmetical labor involved in making these computations is great, since the summation of these products for all bars is involved, although it may be somewhat simplified by using two loads symmetrically placed. The calculating machine is of much assistance in performing these operations. Some designers have been sufficiently bold to assume the areas of all members the same in order to avoid making a preliminary design. Of course, it is obvious that this assumption is far from correct in structures as built; some members such as chord members may have ten or more times the cross-section area of web members.

Eliminating *L* and *A*

A study made by Lee H. Johnson, a student at the Harvard Graduate School of Engineering, and the writer had for its purpose the determination of the difference between

$$\frac{\sum \frac{stL}{A}}{\sum \frac{t^2L}{A}} \text{ and } \frac{\Sigma stL}{\Sigma t^2L} \text{ and } \frac{\Sigma s}{\Sigma t}.$$

The modulus of elasticity, E, is usually the same for all of the material and so may be factored out of each term in the numerator and the denominator. The numerator and the danominator each consist of a series of terms, equal in number generally to the number of bars in the structure, for example, the last expression

$$\frac{\Sigma s}{\Sigma t} = \frac{s_1 + s_2 + s_3 + \cdots s_n}{t_1 + t_2 + t_3 + \cdots t_n};$$

The second expression is built up from this one by multiplying each term in the numerator and the denominator by its corresponding tL so that

$$\frac{\Sigma stL}{\Sigma t^2L} = \frac{s_1t_1L_1 + s_2t_2L_2 + s_3t_3L_3 + \cdots s_nt_nL_n}{t_1^2L_1 + t_2^2L_2 + t_3^2L_3 + \cdots t_n^2L_n}$$

The first expression is built up in a similar way by multiplying each term of the previous expression by its $\frac{1}{A}$. So that the study was to find the value of $\frac{\Sigma sk}{\Sigma tk} - \frac{\Sigma s}{\Sigma t}$ where k may be t, L, A or combinations of these for each bar.

It is readily seen that the difference will be zero when $k_1 = k_2 = k_3$, that is, when the k for each member is the same. The difference will also be zero when $\frac{s_1}{t_1} = \frac{s_2}{t_2} = \frac{s_3}{t_3} \cdots \frac{s_n}{t_n}$. Since in structures the areas are not constant, nor are the ratios of length to area constants, attention was directed to the $\frac{s}{t}$ ratio.

Influence tables for X were calculated for a number of representative existing structures for which all data regarding dimensions were available. The accompanying diagrams, Figs. 2 and 3, show the close agreement between values obtained between the exact expression

$$\text{for } X = -\frac{\sum \frac{stL}{A}}{\sum \frac{t^2L}{A}}$$

and the other expressions, including $\frac{\Sigma s}{\Sigma t}$ for structures of widely different types. By an analysis of the differences between the various series one is enabled to account for the differences between the various diagrams.

The results of this study indicated that an approximate design can be made

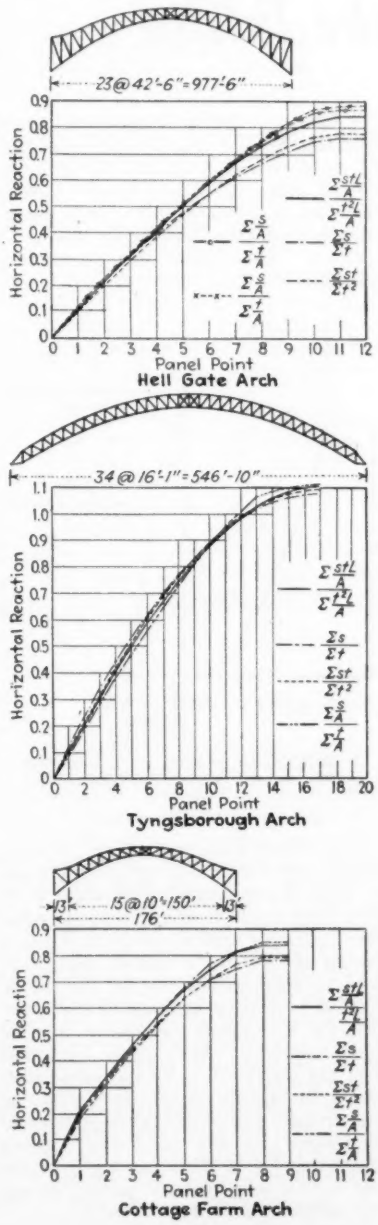


FIG. 2—INFLUENCE LINES for horizontal reactions of two-hinged arches obtained with exact and approximate expressions. Close agreement is evident.

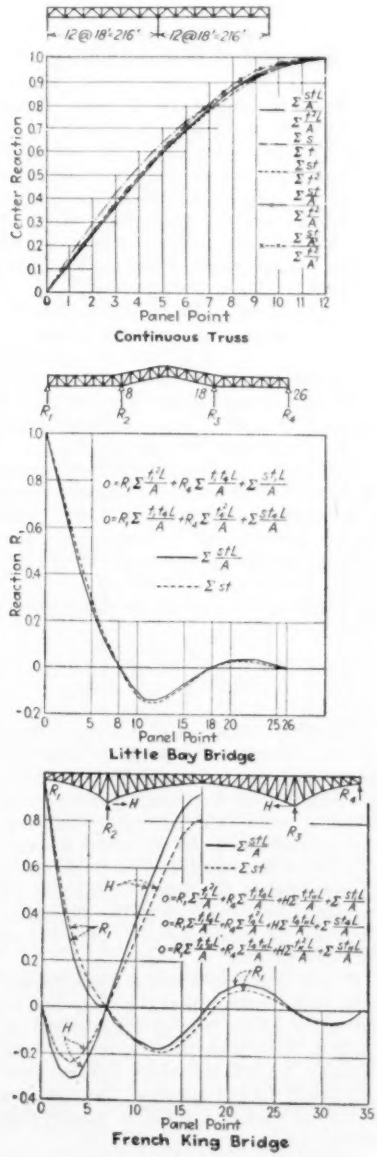


FIG. 3—REACTION INFLUENCE LINES for continuous trusses reveal how closely approximate expressions follow the more exact one.

by finding X from the expression $\frac{\Sigma s}{\Sigma t}$ and thereby avoid making a preliminary design on the basis of assuming the structure to be a beam rather than a frame. Furthermore, the terms in this expression can all be used for checking the final design in which $X = -\frac{\sum \frac{stL}{A}}{\sum \frac{t^2 L}{A}}$

without any loss of labor. For parallel chord continuous trusses, finding X from the expression $\frac{\Sigma st}{\Sigma t^2}$ gives a better approximation than $\frac{\Sigma s}{\Sigma t}$ and so is to be recommended.

A paper of which this is an abstract was presented by the writer at the January meeting of the designers' section of the Boston Society of Civil Engineers.

Letters to the Editor

Suspended Bunker Design

Sir—The report by Messrs. White and Smith in the March 6 issue covering their investigation of the effect of lateral pressure on the cross-sectional slope of suspended coal bunkers, calls to mind a similar study carried on by the writer several years ago based on actual measurements taken on a number of bunkers under various conditions of loading. The ratio of depth to one-half the span, S/L, in these bunkers varied from 1.2 to 2.0 and two of them were surcharged by means of straight sides constructed above the top of the supporting girders for a distance equal to about one-half the span.

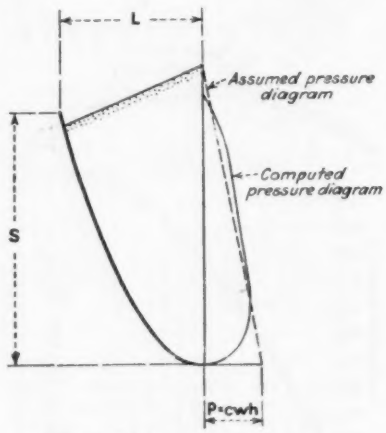
Conditions similar to those observed by Messrs. White and Smith were noted and found to agree more closely with curves constructed by means of force and equilibrium polygons, in which horizontal pressure was included, than with the usual curves derived by the formula,

$$Y = \frac{S}{2L^2}\left(3x^2 - \frac{x^3}{L}\right)$$

Working backwards, however, from curves determined by field measurements and using known vertical loads, the diagram for horizontal pressure was found to resemble the curve shown herewith rather than the accepted triangle in which the pressure is assumed to be proportional to the depth. This may be explained by the effect of the change in slope of the sides against the coal at different depths.

It was noted in shallow bunkers and very deep bunkers, that the distortion of the sides under various conditions of loading was more pronounced. When partially loaded, the sides took a position inside of the curve of the equation and, fully loaded, a position outside this curve.

As pointed out, this change of position becomes troublesome at the end plates, the supporting girders, and with equipment connected to the bottom of the bunker. For this reason it seems desirable to limit the S/L ratio to $1\frac{1}{4}$ to $1\frac{3}{4}$ within which limits the distortion is less pronounced. Where greater capacities are required within given spans, they can be provided for by means of straight sides above the supporting girder.



HORIZONTAL pressure in a suspended bunker is not directly proportional to depth.

The illustration used by Messrs. White and Smith, having an S/L ratio of 2.35, if surcharged with walls 3 ft. 9 in. high would have approximately the same capacity with L = 14 ft. 4 in., a saving of 1 ft. in the over-all depth. A wall of such height can be framed in steel at very little increase in cost over that for a complete suspension type of equal capacity. And it will be found that the shape taken by the suspension plates in loading up to the bottom of the straight walls will remain practically unchanged by the surcharge applied above that level. This fact was brought out by the experiments carried on by the authors on their test model.

Within the S/L limits mentioned above, it will be found that the very convenient equation for a parabola will give a curve nearly coincident with the actual equilibrium line under full load yet enough inside of it to compensate somewhat for the straightening out of the sides under partial loading.

T. R. [illegible]
Chief [illegible]
New England Structural [illegible]

Everett, Mass.,
March 12, 1936.

* * *

Sir—The article on bunker design by White and Smith is a very commendable addition to the knowledge of structural design. Theoretically, the problem is a simple one, and belongs to the subject of membrane stresses—a topic which is well treated from the theoretical point of view in a number of texts. The practical difficulty lies in the determination of the normal pressure on the membrane in the case of a bunker, and one is forced to fall back on rather crude estimates of such pressures.

During the design of a coal bunker for the Edmonton city power plant in 1931, the writer tried an experiment with paper as described by the authors. He found that when the sand was poured in loosely, the sides tended at first to pull quite straight, and that the bottom portion assumed a rather sharp curvature. As the loading continued, the radius of the curved part did not change appreciably, but the sides did bulge slightly, to carry the normal pressure as required by the membrane theory. After the model was full, the bottom was lifted up by pressure from below, and it was found that it would stay at any height, and the radius of the curved bottom increased considerably. Obviously, then, there is a whole range of equilibrium positions, as would be expected from the theory of granular materials. This appears to indicate that the choice of curve is a relatively unimportant matter.

When the writer saw the ore bunker at Kimberley, B. C. several years ago, it seemed to be getting along very well, and this in spite of the fact that all of the channel irons which the designer had used on the outside—in order, presumably to stiffen the plate—had fractured completely through. This points to the fact that the shape of the loaded bunker is dependent on how the load comes on and what pressures develop during filling. Furthermore, one may conclude that it is futile to attempt to resist the change in shape which takes place.

In actual design, the sum of the vertical components of the forces which act at the supported edge of the membrane must be equivalent to the total vertical load. The thickness of the plate can easily be determined by finding the net required area through the rivet holes in order to prevent tearing of the plate. Then something can be added for corrosion. If, now, the stresses be figured by the usual theory, or that of the authors, it will be found that they are quite low, and it is not likely that they will go to dangerous

values if any reasonable initial shape has been assumed for the membrane.

The influence of the initial shape on the movement of the bottom, however, is of importance. If the side portions are nearly straight, as in the case of the bunker as constructed in the authors' Fig. 1, the bottom will rise as the bunker is filled. If, on the other hand, the sides are curved too much, the bottom will sink, at least during the early part of the loading, and it will likely stay down at a lower level than its original position. When the bunker at Edmonton was filled, the bottom rose by one-third of an inch. When the gates at the bottom of a bunker are opened, a loosening of the coal takes place and it flows out. The zone of loosening runs up vertically to the top of the pile as will be observed if one tries such an experiment with sand behind a glass plate. Interesting photographs of this phenomenon, taken by Professor F. Takabeya, were published by the Hokkaido Imperial University in Japan, Vol. 2, No. 6. These are well worth looking at. For this reason, during the first part of the emptying process the bottom will rise and the sides bulge out still more.

During the winter just past, a curious deformation of the Edmonton bunker occurred. The weather was extremely cold. As the coal came in, often covered with snow and at a low temperature, it froze in the bunker and formed an arch having the sides for abutments. When the gates at the bottom were opened, the coal below the arch was withdrawn. This upset the equilibrium, the sides bulged out and the bottom was pulled up so much that it buckled. From the nature of this buckling, it is evident that stiffener angles running along the bottom portion of the bunker parallel to its axis would have been useful.

I. F. MORRISON
Professor of Applied Mechanics,
University of Alberta.
Edmonton, Alberta, Canada,
March 21, 1936.

Automatic Flashboards

Sir—In your issue of April 30, p. 627, Mr. Betts's article on automatic flashboards greatly interested us since we have designed an automatic flashboard ourselves. Mr. Betts claimed that his type gave the dam operator complete knowledge as to the amount of spillway obtainable. It also was hinged so that after discharge it could readily be reinstated by replacing the broken pipes Mr. Betts's method therefore requires the replacing of part of the flashboard equipment after every discharge.

The writers while studying under Professor Snader at Stevens Institute of Technology, designed a board which needs no replacing after discharge. It is based on the principle that the resultant of pressure acts at a distance of one-third h, from the base, h being the distance from the top of the dam to the top of the flashboard. Therefore, if we pivot the board on an axis at this point, when the water level reaches the height h, the board will fall over. In order to secure automatic return, it was necessary to put an abutment on the top of the dam with a height equal to one-third h. This prevents the board from falling too far down, since when it reaches this position it will rest on the surface of the water. The slight upward pressure or thrust due to the abutment is sufficient to bring the board back to its original position.

Unfortunately we have been unable to actually experiment with our design and therefore we can not say for sure whether or not it is practical. Mr. Betts's board has been tested, but we would like to know if anything similar to ours has either been tried or disproven in the past.

FREDERICK M. STUHRKE
PAUL N. FIMBEL
Stevens Institute of Technology,
Hoboken, N. J.
May 7, 1936.

Detroit Building Code Adopted

Sir—In your editorial "Building Code Delays" in the May 14 issue, I feel that somewhat of an injustice has been done to the legislative authorities of Detroit. For the past six years committees have labored to produce a new building code and there undoubtedly has been delay from time to time, but I believe every such delay has been productive of a better code in the end.

Our new code was presented to the Council early in February of this year, was passed in March and became effective April 17th.

JOSEPH P. WOLFF,
Commissioner, Department of
Buildings and Safety Engineering.
Detroit, Mich.,
May 20, 1936.

Outer Drive Bridge Bids

Sir—It was with much surprise that I read your editorial entitled "Championing Inefficiency," in the May 14 issue of the *Engineering News-Record*. As the editorial contains incorrect and misleading statements, I give below the actual facts involved in the case.

The work involves the steel superstructure for the Randolph St. pylons, Field Boulevard, Wacker Drive, south plaza, north plaza, north approach, Michigan Canal bridge; a retaining wall, back filling and grading for the Monroe St. approach; and a drainage system. This is all approach work and does not include the bridge over the Chicago River on which work is being resumed under an old contract signed in 1931. The total length of the approach work is approximately 4,200 ft.

The low bid received at the first letting, was $2,097,224 with a time of completion of 750 calendar days. These first bids were rejected for three reasons; first, there was direct evidence of insufficient competition for the steel; second, the time of completion far exceeded the approved schedule; third, the Grantee entered into negotiations with the low bidder to have the bid price reduced, which is in violation of PWA principles in awarding contracts.

For the second letting the work was subdivided in 9 sections; 5 sections for furnishing, fabricating and delivery of steel; 3 sections for the erection; and 1 section for the retaining wall, approach grading and the drainage work. This subdividing and refiguring accomplished the following definite results:

1. The low figures for each subdivision totaled $2,005,164 which is a saving of $92,060. There is no possibility of this being other than a definite saving unless you consider the saving which might have been made if I had approved the Grantee's negotiations with the original low bidder.

2. The time of completion was reduced from 750 days to 300 calendar days.

The three steel erection subdivisions were awarded to one company so that there will be no possible chance of any interference in this work. Even if a different contractor had been low on each of the three subdivisions, there would still have been plenty of elbow room as each section is a continuous length of viaduct construction, with one section entirely on the north side of the river. If there is any interference at all it will be at each end of the river bridge and would have occurred even if the contract had been awarded to the low bidder on the first letting.

C. H. BAUER,
Chicago, Ill., State Director, PWA Illinois.
May 19, 1936.

Lift Span Erection

Sir—I have read with great interest the article in your issue of May 7, describing the procedure for erecting the lift span of the Triborough Bridge. The method involved some novel features which should be of interest to all bridge engineers.

The article states: "It is believed that the Harlem River Bridge is the first lift bridge to be completely assembled on floats." This statement is in error. The company with which I am connected in 1914 erected a 300-ft. swing span and two 250-ft. fixed spans for the Texas & Pacific Railway at Melville, La., all of which spans were erected on a car float brought from New Orleans and cut at the bridge site into three barges for this purpose. Also, in 1926 the lift span for the Chesapeake City Bridge over the Chesapeake & Delaware Canal was erected by the same method. It is my impression that the Chesapeake City span, 261 ft. in length, was the longest lift span that had been constructed up to that time.

W. H. ELLIS,
Asst. Engr. of Erection, Phoenix Bridge Co.
Phoenixville, Pa.
May 13, 1936.

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June 4, 1936

Progress Continues

ONE of the favorable signs of the advancing season is the fact that house building and the construction of manufacturing plants are going forward at increasing rate. The revival that set in a year and a half ago and that marked the re-entrance of enterprise, initiative and investment capital into the national economy is accelerating steadily. Even the uncertainties of a presidential year have not been able to check the growth. As an index of general recovery no more promising sign could be found. But it is chiefly significant for the construction industry, still the most backward of the country's major activities; housebuilding and plant expansion in turn create need for the many other betterment operations and new facilities which form so large a part of normal construction. Thus, the favorable outlook forecast at the beginning of the year is being realized. It may be hoped that this outlook will be further improved by guiding the new growth wisely through better building codes and sound expansion planning.

Decision by Local Politics

AT THIS WRITING it appears that the two most vigorously discussed national construction projects of recent times, the Passamaquoddy tide-power plant and the Atlantic-Gulf canal across Florida, have been judged by the Senate with the result that Quoddy is turned down, while the Florida canal is to be continued. Evidence of some sense of national responsibility is visible in this action of the deliberative half of our national legislature. The very fact that question was raised about these projects is encouraging in contrast to the supine acquiescence in administrative fiat-determination of such great undertakings that has been the rule for three years and, according to the Administration's demand, must be continued. But in view of the character of the discussion in the Senate it would be going beyond the truth to say that the Florida canal was approved as a worthy and desirable national enterprise, or that Quoddy was turned down as being the opposite; the actual procedure in the Senate too obviously reflected blind sectional partisanship. Maine's objection to the Florida canal clashed with the superior voting strength of southern and Administration spokesmen, and the latter not only put over the canal but in revenge placed their veto on Quoddy. Thus the apparent sense of national responsibility on the part of the Senate is evidently none too real, and the picture is one of decision by local politics and clique preference rather than by sound consideration based on the national interest.

Soil Sampling Progress

NO MORE UNCERTAIN PRELIMINARY confronts the soils research engineer than that of obtaining samples of foundation soil in its undisturbed state. This is particularly true where the sample is to come from considerable depths and some manner of precise core drilling must be resorted to. Chances for disturbance lie in forcing the coring device into the soil, in the friction of removing the core from the extraction cylinder, and in the swelling of the soil during transportation, storage and testing after it is relieved of underground pressure. Altogether, perhaps, no possibility exists of obtaining a sample of completely undisturbed soil. But invention in sampling devices is constantly approaching perfection, and so long as the engineer or the physicist who seeks to study soils must do with the means that invention provides he may take satisfaction in knowing that these are notably good considering the difficulties of the operations involved. The special case of soil sampling at depths exceeding 200 ft. that we describe in this issue is a leading example of the progress in the working tools of soils mechanics that continued study is providing. How widely this study extends is indicated by the half-score of papers on soil sampling presented for discussion at the International Conference on Soils Mechanics convening this month at Harvard University, hailing from Holland, Egypt, England and the United States. Nowhere is the difficulty of obtaining samples of undisturbed soil accepted otherwise than as a challenge to be met by ingenuity. With such spirit problems exist only to be solved.

Valuable Public Service

NOT OFTEN IN THE WORK of technical or industrial associations does such direct occasion arise for protective service to the public as the American Water Works Association has found in improving hotel sanitation. When the Chicago outbreak of amoebic dysentery during the Fair three years ago uncovered the existence of alarmingly bad plumbing and sanitary conditions in one or two hotels, the surprising fact soon developed that many other hotels were almost equally defective. It appeared that there were dangerous possibilities of return of polluted drainage to the water system, as well as hazards of contamination of foods and beverages by leakage or drip from drain lines running over or alongside kitchens and water cooling plants. The association resolved to promote a cleanup, by restricting its convention patronage to hotels whose sanitation had passed a thorough inspection for health safety. The experience of the past three years proves the value of the plan. Even some hotels of high repute did not pass inspection, or else passed only after making important changes in their piping and their operating arrangements. The association is entitled to public appreciation for its work, since the general traveler has benefited even more than its own members. It should continue this useful public service. And if it could find means to extend the campaign into a general movement for rigid hotel inspection by public sanitary authorities, supported by adequate publicity for the good and the bad conditions found, it would have still greater claim to the community's gratitude.

Revolt Beginning

FOR SOME YEARS PAST a definite apathy toward further reclamation appropriations has been crystallizing in Congress, as well as among the general public. It could hardly be otherwise when, coincident with requests to build new and costly irrigation works, there was equally regular complaint that reclamation land-owners

could not repay the government's no-interest loan and must have a moratorium. Ordinary business sense was bound to tell citizen and Congressman that if the projects so far built cannot pay out then it is poor business to spend public money on additional projects of much higher cost; for no investor ever is anxious to throw good money after bad by placing additional investment in a bankrupt enterprise. Events of the last few weeks suggest that the passive apathy is now becoming active opposition. The holdup of the reclamation appropriation bill is an unmistakable sign of rebellion against water users' greedy demands. Though this holdup may be due in large part to mere political maneuvering, and a compromise to let the appropriation go through is likely, yet the revolt once initiated is certain to grow stronger. Such opposition can be overcome, however, if reclamation really is the sound and desirable national undertaking that its friends claim it to be. One sure way to this end is the adoption of a rigid debt-paying policy. Let every western Congressman stand firm against continued moratorium demands and repudiation desires, and reclamation can soon be caused to stand forth in its true colors. If it thus proves itself sound, continued reclamation need fear no opposition; if not, it ought to be closed out quickly.

A Flood-Control Policy

THE SENATE, in rewriting the omnibus flood-control bill passed by the House last year, has inserted provisions that will become the federal-flood-control policy if approved by the House. Even though it is not possible to agree fully with the policy as laid down, the Senate is to be commended for having taken this step. Due to the lack of any established principles of action, the nation was rapidly moving toward making all flood control a federal responsibility, and there was definite prospect that local regions everywhere would appeal for any project that had a remote chance of helping to reduce flood damage, regardless of cost or economic justification.

The policy laid down by the Senate recognizes that the federal government has an interest in all floods on navigable rivers and their tributaries and provides for federal participation in projects where the benefits exceed the cost if the project is approved by the Corps of Engineers (or by the Soil Conservation Service, when soil conservation is involved). These two agencies are to study and report upon the project; the execution of approved projects is to be carried out by one or both of them, depending upon its character. The projects are to be operated by and at the expense of the benefited communities, and these communities are to provide land and protect the federal government against damage suits. The federal government will give its approval, within defined limits, to interstate compacts for flood control on interstate streams.

In the main these are excellent provisions. Nevertheless the policy outlined falls short of what was to be hoped for. National planning of flood control might well have been provided for, as one element in broad national planning for water use. The establishment of such a planning board was proposed in an amendment that failed to pass. Had such planning been provided for, there would have been no need for dividing responsibility for execution between the army engineers and the soil conservationists; the need for soil conservation operations would have been recognized by the National Planning Board but their execution could have been left to the local flood control agencies. In fact, there appears to be no reason why much of the construction of storage reservoirs should not be placed in the hands of the local agencies with the army engineers acting simply as the federal government's representatives.

However, too much cannot be expected of this first attempt to define the federal government's relation to flood control, especially in view of the concerted efforts to put all the cost of such work on the federal government. Probably it is sufficient that the essential principle that beneficiaries participate in the cost has been preserved. The details of how this shall be made fully effective and maintained, especially where large interstate streams are involved, can be worked out as individual cases arise.

Water Worries

ON THE EASTERN SEABOARD two of our most populous metropolitan districts, New York and northern New Jersey, face a water shortage that is inevitable unless they take immediate measures to develop new sources of supply. The situation of New York is perhaps the more acute, but New Jersey is much farther from approaching the necessary action.

New York's present demand, which is increasing daily, is nearly one billion gallons per day, and the safe yield of the existing supplies is only a few per cent above this amount. Thus the supply is barely adequate for immediate needs and contains no margin of safety to cover growth. It is true that there is a plan to bring in a substantial increase of the present supply; the upper reaches of the Delaware River are to be tapped, adding 50 per cent of the amount of water now available. But in order to impound this water and bring it to the distribution mains will require a construction period of 7 to 10 years. Restriction of water use may be necessary long before the new works can be completed.

But at least New York has a plan. The New Jersey metropolitan area, comprising scores of separate communities jointly dependent on a limited number of sources, has done almost nothing toward formulating a comprehensive plan of water development since the first state water policy commission was appointed in 1882. Sectional rivalries and political philandering have militated against every effort to provide a basic formula for consistent development. The Wanaque Reservoir, completed in 1928, was considered ample for the needs of the New Jersey metropolitan area when it was planned in 1911, but since that time the growth of industry and population indicates the imminence of a shortage. Two projects, either of which will assure adequate future supply, have been recommended by opposing factions, but controversy rages as to which shall be developed because there is no state commission with authority to decide on a course of action and power to carry it out.

It is incredible in the face of this obvious water famine that procrastination is the calmly accepted order of the day. Public opinion, presently unmindful of water worries, unfortunately will not be aroused to the critical nature of the situation until it is too late. The future wellbeing of millions of people rests in the hands of a few whose proper discharge of responsibility calls for immediate action in developing new water supplies.

CURRENT NEWS

Relief Bill Passes Senate

Includes provision for held-up reclamation projects—PWA gets $300,000,000 for grants on 45 per cent basis

THE $1,425,000,000 deficiency bill passed the Senate June 1. The bill provides for continuing the PWA works program by making $300,000,000 available for grants, from previous appropriations. With 45 per cent grants this will provide about $650,000,000 of construction. The total includes $50,000,000 in cash received from the sale of municipal bonds by PWA and $250,000,000 in bonds turned over by PWA to the Reconstruction Finance Corporation for sale. Proceeds from the sale of such bonds have previously been available for loans but not for grants to new projects. The bill requires that projects financed by WPA must be completed by June 30, 1938. In addition to this $300,000,000 in bonds and cash, PWA also holds approximately $150,000,000 in municipal securities that will be available, when converted into cash, for loans to new projects.

The extent of the public works program lies entirely in the President's hands, as the maximum authorized by the bill is subject to his discretion.

Impounded funds returned

The relief bill, as amended by the Senate, also authorizes the President to restore, to PWA, funds that since December 28, 1934, have been impounded, and transferred to the Federal Emergency Relief Administration. These include $400,000,000 that was diverted to the Civil Works Administration in the winter of 1934-35 and $300,000,000 to $350,00,000 that Administrator Ickes has been ordered from time to time to transfer to Administrator Hopkins to meet the exigencies of direct relief and work-relief programs. Inclusion of this provision in the Senate bill was a surprise to PWA officials and they do not regard it seriously, as restitution to PWA of funds long since spent by FERA could be made only out of the new relief appropriation, and President Roosevelt has plainly expressed his objection to ear-marking any part of the new money for PWA.

Florida Canal and Quoddy

With reference to distribution of the new work relief appropriation, the bill as reported from the committee, ruled out federal projects to which allotments made by the President are not sufficient for completion, but the Senate, by amendment on the floor, included provision for an allotment of $10,000,000 for the Florida canal, if a board of three engineers, to be appointed by the President, reports favorably on the project. Similar provision for an allotment of $9,000,000 to the Passamaquoddy tide power project was defeated. Senator Robinson, the majority leader, offered his resolution, including both projects, as an amendment to the bill, but a division to permit a separate vote was asked for by Senator Hale, Republican, of Maine, with a result exactly contrary to what he expected.

$20,000,000 for Grand Coulee

In an attempt to break a deadlock with the House on appropriations for the Reclamation Service (*ENR*, March 5, p. 364; March 28, p. 792), the Senate adopted an amendment to the work-relief bill providing $57,610,000 for reclamation projects, including $20,000,000 for Grand Coulee. The projects have been previously authorized, and appropriated for, in the Interior Department appropriation bill, as passed by the Senate, but the House has refused to accept them. Inclusion of the reclamation items in the relief bill is regarded as an effort to force their adoption by the House.

The bill will now go to conference where the differences between the House and Senate bills will be adjusted. Senators Adams, Glass, McKellar, Hale, and Keyes have been appointed senate conferees.

Federal-Aid Highway Bill Sent to the White House

Congressional action on the 1938-39 federal-aid highway authorization bill was completed June 1. The bill, approved in final form by the House, now goes to the White House for approval. The President has previously expressed his objection to the advance-authorization method of carrying on the highway construction program but a veto is not expected.

Laramie River Decision

By an injunction granted by the U. S. Supreme Court to the state of Wyoming, June 1, Colorado is restrained from taking more water from the Laramie River for the irrigation of meadow lands than is permitted under a prior decision of the court. The court declined, however, to enjoin diversions at the Skyline ditch or to order Colorado to install measuring devices to determine amounts of water taken by appropriators there. The court intimated that it would take further action if the two states are unable to agree on putting in such measuring devices as may be necessary.

First Bids on World's Fair

Bids for the first New York World's Fair contract have been received by the Park Department, and work on the Fair site in Flushing Meadow is expected to start within two weeks. The contract covers general grading of the park site, and calls for the moving of 7,000,000 cu.yd. of fill, all available at the site; the work must be completed by April 1, 1937. The low bid, $1,843,775, was submitted by the D. M. W. Contracting Co., of Brooklyn.

A.S.C.E. Holds Ohio Meeting

Regional group holds large meeting at Cleveland—Local Relief and PWA operations discussed

TWO HUNDRED attended the regional meeting of district No. 9 of the American Society of Civil Engineers, in Columbus, Ohio, May 15 and 16. Prof. John C. Prior, president of the Central Ohio Section, presided, while R. B. Jennings, designing engineer, Columbus sewer department, was convention chairman. Willard T. Chevalier, publishing director of *Engineering News-Record*, spoke at the banquet on the relation of the engineer to current economic trends.

Silting of O'Shaughnessy Reservoir

In a paper on the silting of Columbus' O'Shaughnessy Reservoir, Clarence B. Hoover furnished some significant figures based on a survey made during the low water period of 1934. The reservoir, 8 mi. long and 1,900 ft. maximum width, had an original capacity of 16,673-acre-ft. After nine years of service, the volume of silt was 1,016-acre-ft., equivalent to a loss of 0.02 in. over the entire drainage area of 988 sq.mi. The volume of the reservoir lost from silting, in nine years, amounted to 6.1 per cent. Dividing the 8 mi. length of the reservoir in to four sections, it was found that in the upper section the volume loss was 12.5 per cent; in the second section, 7.7 per cent; in the third section, 4.3 per cent; and in the quarter immediately above the dam, 4 per cent.

Fred E. Swineford, PWA engineer examiner for the state, reported that 486 PWA projects were approved in Ohio, for a total estimated cost of $85,000,000. Mr. Swineford pointed out that there remain on file some $50,000,000 worth of deserving applications, providing a reservoir of future construction.

Better village engineering urged

The importance of village waterworks and sewer construction was emphasized in a paper by E. A. Lawrence of the Jennings-Lawrence Co., Columbus, Ohio. Mr. Lawrence urged that engineering studies be utilized for village work comparable to those made for large city projects. He suggested that the small-city field offered the young engineer a remarkable opportunity for interesting and diverse work.

Orris Bonney described the Columbus sewerage program, 84 miles of sewers costing about $6,000,000. Henry Overman described a six-span concrete arched bridge, faced with Columbus limestone, built at Dublin, Ohio. Edward A. Ramsey spoke on Columbus' new refuse incineration plant (*ENR*, April 23, 1936, p. 591); Howard R. Edwards, on the WPA traffic survey in Columbus. Robert A. Allton and Robert T. Register described described the new sewage treatment works in Columbus.

New England Organizes for Interstate Flood Control

To facilitate action in flood control and flood prevention methods, the New England states have set up official bodies to negotiate with each other on such matters. This action will arouse cooperative effort to prevent floods in this area. The omnibus flood control bill carries about $5,000,000 for flood prevention work in New England, and a House bill which now has passed the Senate, allows interstate contracts for flood control and the regulation of stream pollution on streams flowing through two or more of the following states: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, West Virginia, Ohio, Kentucky, Tennessee, Indiana and Illinois.

State planning boards to act

A conference of governors was held, May 25, at the invitation of Governor Curley, of Massachusetts, to lay out a plan of cooperation on the flood problem. Massachusetts and New Hampshire have authorized their State Planning Boards to negotiate contracts with the other states affected, and with each other. These contracts, of course, would be subject to approval by the state legislatures and by the United States Congress. The necessity for such interstate agreements arises from that provision of the omnibus flood control act which requires that the state obtain all water rights and rights of way and pay all damage claims. Thus, states in the Connecticut River valley would be required to contribute $3,440,000 on a federal grant of $10,028,000, while states in the Merrimac River Valley would be called upon to contribute $3,500,000 to the government grant of $7,725,000.

Local payments favored

Although there is pressure in Congress to amend the omnibus bill so that the federal government would pay for land damages as well as construction costs, the chairman of the Connecticut Water Commission points out that it would probably be cheaper for New England to pay its own land damage costs than to pay its share of the additional taxes that would result from applying this policy to the very large flood control projects proposed for certain other sections of the country.

Preliminary phases of the work are getting under way as cities in the lower Connecticut valley, in Massachusetts and Connecticut, and along the Merrimac River, in New Hampshire and Massachusetts, are consulting with respect to flood measures. Hartford, Conn., has already created a flood commission, with an appropriation of $75,000. The War Department is making field and office studies of practically all the major streams in New England, with a view to recommendations as to flood control projects.

An interim commission to negotiate interstate compacts has been appointed by Vermont. The commission is headed by Ralph E. Flanders, and includes Frederick W. Shepherdson, Arthur H. Packard, Fred C. Martin, Carrol E. Jenkins, A. G. Sargent and Walter S. Benton. The Maine and Massachusetts councils of the New England Council have appointed flood control authorities to advise them on various projects.

State May Build Roads in Portland

State highway commission may build new roads or reconstruct existing streets within the borders of the city

THE Oregon State Supreme Court, on May 26, gave the State Highway Commission authority to build roads within the city limits of Portland. While the decision referred only to the city of Portland, the ruling is interpreted as applying to every city in the state.

The decision is held by the state highway commission to be one of the most important in its history.

The opinion, affirming a lower court's decision, held that the highway commission can:

1. Establish highways, either primary or secondary, within the corporate limits of the city along routes where there are no established streets or roads.
2. Exercise the power of eminent domain to obtain rights of way within the city limits, either to build new roads, or to widen or improve existing streets or roads.
3. Pave, repair and maintain streets and roads within the city limits.
4. Employ state highway funds for the above purposes, where the work forms a link in the state highway system.

"The right to designate, construct and maintain state highways resides primarily in the legislature," the court held. "The Oregon legislature has delegated this right to the State Highway Commission."

"The power to establish and construct, through incorporated cities and towns, highways not theretofore located, and to reconstruct, pave, improve, and repair existing roads, is not contingent upon the consent of the governing body of any city or town, except when a change of grade in any such street or road is involved."

No Vote Needed on PWA Loans To Florida Cities, Court Holds

The Supreme Court of Florida, in a decision handed down on May 23, stated that Florida cities may borrow from the PWA, for improvements to revenue producing utilities, without public referendum.

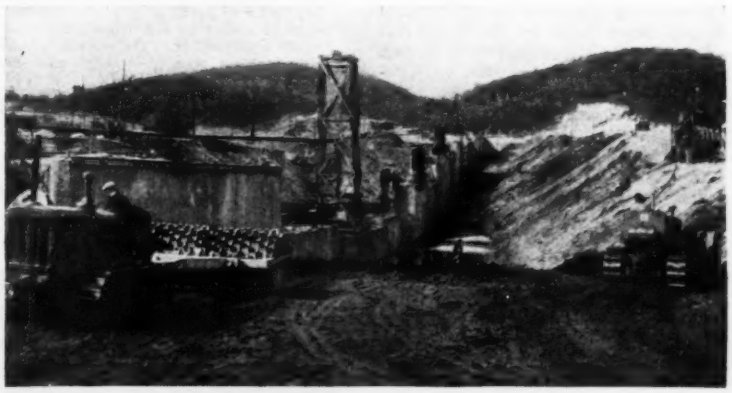
The main question at issue, whether a referendum was necessary, depended on the answer to a subsidiary question: Whether the "revenue certificates," pledging collections from the revenues produced by the utilities in question, are in fact bonds, and, therefore, whether taxable property may be made to bear the burden of repaying them if revenue from the utilities is insufficient.

The court held that such certificates are not bonds, that taxable property is not pledged, and that, therefore, no referendum is necessary before application for loans secured by such certificates.

Key West Highway Approved

The PWA has made a loan of $3,600,000 to the Overseas Road and Toll Bridge District for construction of a highway, including bridge structures, from lower Metacombe Key to Torch Key in Monroe County, Florida.

The project will close a stretch of open water, now crossed by ferry, in the present highway from the mainland to Key West. The bridge portion of the project provides for rehabilitation of railway structures over which the Florida East Coast Railway Co., until recently, operated. Since the hurricane last fall, operation of the railway, south of Florida City, has been discontinued. The Overseas Road and Toll Bridge District proposes to purchase the present railway structures and rebuild the bridges to provide a highway. Existing railway fills will be lowered and widened to provide subgrade for the highway.



PNEUMATIC CAISSON COREWALL FOR QUABBIN DAM

The sinking of 40 pneumatic concrete caissons to form the cutoff wall of the proposed Quabbin Dam on Swift River in Massachusetts has been completed by Two Companies, Inc., contractor for the corewall. Quabbin Dam will be the second of two large hydraulic-fill earth embankments required to create Quabbin Reservoir, Boston's new water supply. The first, Quabbin Dike, is now under construction. Bids are now being called for the main dam. It will contain more than 2½ million cu.yd. of fill.

The above view shows part of the line of caissons, sunk end to end across the valley, with backfilling of the core trench in progress. Each of the 40 caissons is 9x45 ft. in plan; they are from 45 to 120 ft. deep. The process of sinking was similar to that used on the dike corewall, described in *ENR* Aug. 24, 1933, p. 215. Quabbin Dam will be the last major feature of the new water supply project. It is being built by the Metropolitan Water Supply District Commission.

Colorado Water

Supreme Court defines the position of Arizona with respect to the use of waters of the Colorado

THE United States Supreme Court, in denying the petition of the State of Arizona for leave to enter suit against the six other states of the Colorado River Basin (noted briefly in last week's issue), has defined the position of Arizona with respect to beneficial use of the waters of the Colorado River. Arizona applied to the Court last November for permission to file suit against the other states with a view to acquiring a permanent title to a definite share of the Colorado River water, the share to be determined by the Supreme Court.

In denying the plea the court stated that Arizona's contentions "so far as they were not answered adversely to Arizona in *Arizona vs. California*, 283 U. S. 456, cannot be judicially determined in a proceeding to which the United States is not a party and in which it cannot be heard."

Claims by Arizona

The text of the opinion analyses the nature of the claims made. The chief claim was that Arizona is entitled to an equitable share of the Colorado River water, and that the diversion and use of this share by any of the defendant states pending its diversion and use by Arizona shall not constitute a prior appropriation or confer upon the appropriating state any right in the water superior to that of Arizona. To support this claim it was represented that future reclamation of land in Arizona can be accomplished only by large-scale projects, which cannot be financed unless water can be appropriated and incontestable rights to the permanent use thereof acquired before the works necessary to such projects are constructed.

History of controversy

A division of the river water between upper and lower parts of the basin was agreed upon in the Colorado River compact of 1922, which was later ratified by Congress and by the six states of the basin other than Arizona. Later the Boulder Canyon Act, based on the terms of this compact, granted Congressional authority to California and Arizona to enter into an agreement for division of water in stipulated amounts. As no such agreement has been consummated, and Arizona has not recognized the compact, the court states, Arizona has acquired no rights under the compact and in fact disclaims the assertion of any such rights in its brief. The opinion says that "A justiciable controversy is presented only if Arizona, as a sovereign state, or her citizens, whom she represents, have present rights in the unappropriated water of the river, or if the privilege to appropriate the water is capable of division and when partitioned may be judicially protected from appropriations by others pending its exercise."

Rights to water defined

The court then notes that all the Colorado River Basin states except California, and California so far as is material to to this case, apply the doctrine of appropriation to the waters of flowing streams in their respective territories. Diversion and application of water to beneficial use entitle the appropriator to a continuing right to use the water so far as reasonably required and actually used. The appropriator first in time is prior in right over others upon the same stream, and the right, when protected by use, is deemed effective from the time the purpose to make the appropriation is definitely formed and actual work upon the project is begun."

Water overappropriated

The court declared that the natural dependable flow of the river is already overappropriated, and that without storage no substantial amount of water would be available for appropriation. Such storage was provided by the federal government through the construction of Boulder Dam, and the right to use the stored water is defined by the Boulder Canyon Act. On this point the opinion says that "The 'equitable share' of Arizona in the unappropriated water impounded above Boulder Dam could not be determined without ascertaining the rights of the United States to dispose of that water in aid and support of its project to control navigation, and without challenging the dispositions already agreed to by the Secretary's [Secretary of the Interior] contracts with the California corporations, and the provision as well of Par. 5 of the Boulder Canyon Project Act that no person shall be entitled to the stored water except by contract with the Secretary."

This Supreme Court decision means that an act of Congress permitting Arizona to sue the United States together with the six states which ratified the compact will be necessary before the proposed suit will be entertained by the court.

F. W. Roebling, Jr., Die

Ferdinand W. Roebling, Jr., president of John A. Roebling's Sons Co., died May 29, at the age of 57. Mr. Roebling, grandson of John A. Roebling, founder of the firm, was the designer of wire-drawing machinery that is still in use.

Mr. Roebling was born in Trenton, N. J. He graduated from Lehigh University in 1901 with the degree of Mechanical Engineer, and immediately entered the Roebling plant in Trenton as an engineer. In 1914 he became assistant treasurer, and in 1917 treasurer, when his father Ferdinand died. He became vice-president in 1921 following the death of his brother Karl, and in 1926 became president of the firm, succeeding his uncle, the late Washington A. Roebling.

Irrigation Program in Mexico

The Mexican National Irrigation Commission has announced that President Lazaro Cardenas' irrigation program is to be begun this summer with an investment of about $25,500,000 in works in Durango, Coahuila, Tamaulipas and Sonora states. About 1,500,000 acres are to be watered. The work includes building three dams, one at El Palmito on the Nazas River, to impound 25,000,000 acre-ft. of water, to irrigate 1,000,000 acres in the Laguna district, Mexico's largest cotton belt; another at Azucar on the San Juan River, Tamaulipas state; and the third at Angostura on the Yaqui River, Sonora State. Five smaller dams are to be built in various regions.

The work also includes building of roads and work camps, including a highway between Bermejillo and El Palmito, Coahuila state, to cost $600,000, and a camp in Sonora that is to cost $170,000.

NEW AIRPORT FOR LONDON NEARLY COMPLETED

Although delayed by bad weather, construction of the new London airport at Gatwick is now approaching the final stages. The concrete runways and the extensive and interesting layout of paved areas over which the ships will be taxied to and from the six loading docks are complete. The circular administration building, with its extensive roof observation facilities, is undergoing finishing operations.

The new airport will be a rival of Croydon as a terminus for air services crossing the English Channel. Located beyond the Surrey Hills, it is outside the London fog area. Connections to London are by highway or the Brighton railway line.

Washington Highlights

By Paul Wooten

A resolution authorizing expenditure of $3,000,000 for construction in Washington, D. C., of a memorial to Thomas Jefferson, was adopted by the House on June 1. The site would be selected by a memorial commission.

Appropriation of $33,675,135 for a four-year Army housing construction program was approved by the Senate June 1. The measure now goes to the House. It would provide $8,929,376 the first year, $8,435,828 the second, $8,426,699 the third, and $7,833,232 the fourth.

A bill, which passed the House June 1, will permit PWA, in its low-rent housing program, to use the proceeds from rentals for maintenance and operating expenses. This will remove obstacles created by various opinions of Comptroller-General McCarl. Reimbursement of cities for services rendered in lieu of payment of taxes is provided for in the measure. The bill also would permit PWA to fix rentals at less than the figure necessary to produce a fair return on the cost of such projects. This provision was attacked by a Republican minority which charged that the PWA housing program now will be carried out without any regard for a return on the government's investment. The bill has already passed the Senate in a somewhat different form. No provision for the construction of more PWA housing is included in the work relief appropriation bill.

Among the bills passed by the Senate on June 1 are:

A House Resolution authorizing interstate compacts for flood and pollution control among 14 states. (Passed by House May 19.)

A bill requiring that contractors on government projects provide employee disability and death compensation.

A bill to increase the commissioned strength of the Corps of Engineers to 415 officers.

On the same date the House passed bills authorizing bridge construction: (1) across Chesapeake Bay; (2) across the Savannah River at Augusta, with an extension in time for a bridge near Sylvania, Ga.; (3) Connecticut River at Northampton, Mass.; (4) Waccamaw River near Red Bluff, S. C.; (5) extending time for Missouri River bridges at Miami and Arrow Rock, Mo., and Rulo, Neb. It also authorized flood control surveys of the Penobscot, Androscoggin and Kennebec rivers in Maine; Allegheny and Susquehanna systems in Pennsylvania; Ventura River, Calif.

The Shelter Belt project appears dead; $170,000 will be appropriated to cover existing obligations only. This figure was a compromise arrived at in conference after the Senate had restored an appropriation of $1,000,000 which had been eliminated by the House.

A previous allotment of emergency relief funds will cover planting and other activities to the close of the present fiscal year. Hereafter the planting of wind breaks will continue in cooperation with the state, as was done prior to the announcement of the Shelter Belt project, the plan to lay out a belt of trees 100 miles wide, from Canada to Texas. In attempting execution of this ambitious plan, the Forest Service was forced to adopt so many modifications as practically to destroy the original conception of the project.

Preliminary Surveys To Be Made For Ogoki River Diversion

The Ontario Hydro-Electric Commission has announced that it is preparing plans, and will make surveys, for a project to divert the Ogoki River into Lake Superior.

The Ogoki River at present discharges northward to James Bay. The plan is to divert the flow, amounting to 4,000 sec.-ft., into Lake Nipigon and thence into Lake Superior. It is estimated that this would increase the power available on the Nipigon River by 50,000 hp. Moreover, an additional 40,000 hp. would be provided at Niagara with existing plants; an increase of 100,000 to 150,000 hp. would be provided if new plants were constructed.

Power Company Seeks Priority at Kettle Falls on Columbia

The Washington Water Power Co. seeks to maintain its priority over other possible private developers of the Kettle Falls site on the Columbia River in Washington, according to statements made to the Federal Power Commission on May 25, and is not attempting to block full development of the Grand Coulee site by the federal government. The company now holds a preliminary permit to develop the site and recently applied to the commission for a license in order to keep its rights active. It does not wish the commission to act on its application at the present time.

Construction of the high dam at Grand Coulee would drown out Kettle Falls.

SOCIETY CALENDAR

AMERICAN WATER WORKS ASSOCIATION, annual meeting, Los Angeles, Calif., June 8-12.

INSTITUTE OF GOVERNMENT, eighth annual conference, Los Angeles, Calif., June 15-19.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, semi-annual meeting, Dallas, Tex., June 15-20.

INTERNATIONAL CONFERENCE ON SOIL MECHANICS AND FOUNDATION ENGINEERING, Cambridge, Mass., June 22-26, 1936.

SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION, annual meeting, Madison, Wis., June 23-26.

HIGHWAY SAFETY CONFERENCE, Ames, Iowa, June 29-July 2.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

ILLINOIS ASSOCIATION OF SANITARY DISTRICTS, annual meeting, Urbana, Ill., June 11-12.

NEW YORK STATE SEWAGE WORKS ASSOCIATION, spring meeting, Long Beach, Long Island, June 11-13.

PENNSYLVANIA SEWAGE WORKS ASSOCIATION, annual conference, State College, Pa., June 24-26.

NEW ENGLAND WATER WORKS ASSOCIATION, annual outing, North Scituate Beach, Mass., June 25.

EXAMINATIONS for registration as Engineers, Land Surveyors and Architects will be held as follows:

MICHIGAN—Examinations for engineers and land surveyors at University of Michigan, Michigan State College, Michigan College of Mines, and at Ironwood; for Architects, at University of Michigan, June 18-20.

NEW YORK—Examinations for engineers at Albany, New York, Syracuse and Buffalo, June 22-24.

Brief News

THE BOSTON & MAINE RAILROAD has received an allotment of $2,000,000 from the PWA revolving fund. The loan was made for the purpose of repairing railroad property damaged by floods during March. The railroad suffered substantial damage during the spring floods. Many miles of railroad were under water, causing numerous washouts and slides, as well as damage to bridges in Maine, New Hampshire, Vermont and Massachusetts.

A MILLION DOLLAR PROGRAM for the rehabilitation of the drainage system in Mississippi county, Arkansas, similar to the one now being carried out in Southeast Missouri by CCC units, is to be sought in an application to be filed soon with the federal government in behalf of all the drainage districts of the county. The project calls for the redredging of 159 miles of drainage ditches and for the removal of debris and tree growth from 1,100 miles. The work would require about five years.

ELIMINATION OF THE CHANNEL-IMPROVEMENT project from the district plan has been acceded to by the directors of the Muskingum Conservancy District for Massillon, Ohio, as a result of requests by the city council and property owners. The property owners asked for the elimination of the project because of excessive local cost. The project, on the Tuscarawas river through Massillon, was estimated to cost $1,087,100.

A STREAM POLLUTION COMMITTEE, similar to that of Cincinnati, Ohio, was organized in Louisville, Ky., on May 14. The Louisville committee will have the same program and objectives as those of the Cincinnati committee. These two commissions, which have been organized by the Chamber of Commerce of the two cities, will attempt to obtain immediate action on stream pollution elimination legislation for the Ohio River.

THE LOUISIANA LEGISLATURE is considering a bill which would require examination and licensing of civil, mechanical, electrical, and other engineers, and surveyors. The existing Louisiana statute applies only to civil engineers. Under the terms of the law an examining board of five members would be appointed by the governor. Under the provisions of the revised law, admission to engineering practice would require a diploma from a recognized engineering school and also membership in one of five specified societies. Surveyors would be required to possess a diploma or a satisfactory record of five years practice.

A ZONING PLAN to provide for the orderly growth of West Memphis, Ark., has been approved by the West Memphis Planning Commission. Commercial areas include a 300-ft. section on either side of the main highway, No. 70, a 700 ft. section on the west side of Highway 61, and 1,200 ft. on the east side of the highway extending back to the railroad. Homes in the exclusive sections must be built on lots of at least 50 ft. width, and must be 35 ft. from the street, and 8 ft. from the sides of the lot. On 25-ft. lots, the homes must be 15 ft. from the street and 3 ft. from each side.

More Expenditures Authorized For Work on the Rio Grande

As passed by the Senate on June 1, the Rio Grande canalization bill authorizes an appropriation of $3,000,000 in addition to a previous authorization of $1,000,000 for the proposed American diversion dam, near El Paso, and a canal to connect with the present Franklin canal of the Rio Grande federal irrigation project. Approximately $1,400,000 will be required for diversion dam and canal. The remainder of the authorized appropriation would cover acquisition of a strip of land on each bank of the river extending from Caballo dam to the diversion dam, also construction within this right-of-way of channels to carry ordinary and flood flows. The bill authorizes but does not actually appropriate funds for the project. Construction of Caballo dam is covered by previous appropriations of $1,000,000 to the Reclamation Service and $1,500,000 transferred to the Reclamation Service by the State Department.

Water Development Plan Urged at New Jersey AWWA Meeting

Stating that New Jersey has lagged behind all other States in the adoption of a comprehensive plan of water supply development, Frank H. Sommers, dean of the law school of New York University, urged the New Jersey members of the American Waterworks Association, at a section meeting held at the Wanaque Reservoir on May 27, to contribute their aid in the formulation of a definite policy.

M. N. Baker honored

The group, numbering about 165, paid tribute to M. N. Baker, newly elected honorary member of the American Waterworks Association, retired associate editor of the *Engineering News-Record*.

Following an inspection of the Raymond Dam, head works of the Wanaque Reservoir of the North Jersey Water Supply Commission, the afternoon program of the meeting was devoted to a technical session. Lewis V. Carpenter, professor of sanitary engineering at New York University, spoke on water supply and purification developments; this topic was also discussed by F. W. Green, Passaic Valley Water Commission. J. S. D. Bauerman, chemist of the Newark water department, and Lee Purcell, analyst of the North Jersey District Commission, spoke on methods of maintaining water quality.

The controversy among factional groups in New Jersey, regarding who should be responsible for new water-supply projects, has for years halted progress, according to Dean Sommers, former chairman of the North Jersey District Water Supply Commission. He stated that a state-wide water shortage is imminent, and that it is imperative that immediate action be taken, either by the creation of a State Water Authority or by an extension of power to the district commission. This latter organization represents a group of municipalities, and, under present legislative set-up, may carry on supply developments only by entering into contract with a municipality. Since municipalities are too heavily burdened with debt to finance water supply extensions, the commission can accomplish little.

TVA Claimed Unconstitutional

Tennessee Valley Authority attacked in new suit filed by a group of private utility companies

A SUIT seeking to enjoin all operations of the Tennessee Valley Authority on the ground that the entire program is unconstitutional was filed in the U. S. District Court at Birmingham, Ala., May 29, by nineteen power companies. Simultaneously a similar action was filed in the state Chancery Court at Knoxville, Tenn., where TVA has its principal office.

The bill of complaint filed by the companies contends that the TVA act, and operations thereunder, are unconstitutional on the following grounds:

(1) They are not authorized by any power granted the federal government by the Constitution.

(2) They extend federal power over matters of intrastate commerce and local police powers, contrary to the ninth and tenth amendments to the Constitution.

(3) The Act provides no adequate legislative standard to guide administrative officers; on the contrary, it unlawfully delegates such power to the President and TVA officials.

(4) There is no provision for hearings for those whose rights or property are injured by TVA.

(5) TVA seeks to fix private power rates by subsidized competition, without a hearing, and without the opportunity for judicial review as to reasonableness, thereby denying the companies due process of law according to the fifth amendment.

Personals

WILLIAM L. CROW, former assistant treasurer of the William L. Crow Construction Co., New York, has been elected as president and HAROLD W. CASEY, formerly secretary, has become vice-president.

WATT L. MORELAND, Los Angeles, Calif., has been appointed to membership on the city Board of Water and Power Commissioners. Mr. Moreland will fill the vacancy created by the resignation of W. H. Hay.

EDWARD R. CARY, professor of geodesy and road engineering, Rensselaer Polytechnic Institute, Troy, N. Y., who has been a member of the faculty there for the past 48 years, retired on May 22.

E. L. DALEY, a colonel in the Corps of Engineers, has been transferred from Fort Humphreys, Washington, D. C., to New York City as district engineer for the First New York District.

GEORGE K. LEONARD has been appointed construction engineer for Guntersville Dam, which is being built by the Tennessee Valley Authority. Mr. Leonard has been acting construction engineer at Guntersville since March. He had formerly been assistant construction engineer at Wheeler Dam and prior to that was in the state engineer's office in Nebraska.

JOHN V. KEILY, assistant to the state director of public works in Rhode Island, has been appointed chief of the division of roads and bridges, succeeding the late Maj. John F. Caton. Mr. Keily was graduated from Brown University in 19[illegible] and has been engaged in bridge engineering for the state throughout his entire career. Mr. Keily is secretary of the Rhode Island Highway Association and a director of the Providence Engineering Society.

JOHN FRANK STEVENS, recently elected an honorary member of the Engineers' Club, New York, was the guest of honor at a luncheon meeting held at the club on May 21. Mr. Stevens spoke on his early experiences as an adviser to the Russian government on railway matters during the World War.

HARRY P. BURDEN, professor of civil engineering, Tufts College, has been appointed dean of the school of engineering at Tufts to succeed Dean George P. Bacon, who resigned and is now professor emeritus. FREDERICK H. CRABTREE, an instructor, has been named assistant dean to replace Prof. JAMISON R. HARRISON, now head of the department of physics.

Obituary

FLOYD HUNTINGTON died on May 21 at Colfax, Calif., at the age of 50. Before his illness he was aqueduct tunnel superintendent for the Metropolitan Water District of Southern California. Mr. Huntington, who specialized in tunnel construction, worked on numerous projects throughout the West and South America. He was in charge of tunnel construction at Boulder Dam for the Six Companies.

FRANK FIFIELD HEALEY, civil engineer and construction superintendent on many important structures, died May 21 in Chicago. Born in 1869 in Hingham, Mass., and educated at Stevens Institute of Technology, his early experience up to 1907 was designing and constructing manufacturing plants in Camden, N. J. At that time he went with George W. Jackson, Inc., Chicago, as engineer in charge of the Chicago underground freight tunnel, bridges and terminals. From 1910 until 1918 he was in general construction work. In 1918 was appointed a major in the Construction Division of U. S. Army in charge of construction work at Newport News. After the war he was general superintendent for L. G. Kaufman and superintendent for the L. E. Myers Co. From 1924 to 1926 he was in general contracting as a member of the firm of Hansen & Healey. From 1926 to 1931, when he retired from active work, he was appraisal engineer for the State Bank of Chicago.

EARL STIMSON, chief engineer of the maintenance-of-way department of the Baltimore & Ohio R.R., died on May 27 at Massillon, Ohio. He was sixty-three years old. Mr. Stimson had been associated with the Baltimore & Ohio since 1895, when he became an assistant on the engineering corps of the Baltimore & Ohio Southwestern lines. He became assistant division engineer in 1898, resident engineer in 1899 and division engineer in 1901. From 1905 to 1910 he was connected with the maintenance-of-way department and then was made chief engineer at Baltimore. Mr. Stimson was general superintendent of maintenance-of-way for the Baltimore &

Ohio's eastern lines and several other railroads during the World War, serving under the United States Railroad Administration. He was active in the affairs of the American Railway Engineering Association for many years, serving as its president for one term

VANCE J. DRISCOLL, contractor, of Pueblo, Colo., died on May 21, at the age of 44. Mr. Driscoll was president of the Driscoll Construction Co. and was vice-president of the Colorado Association of Highway Contractors.

FARLEY CLARK, consulting engineer, died at his home in Toronto on May 31. He was formerly chief engineer for the Toronto Power Co. at Niagara Falls, the Toronto Electric Ry., and the Toronto Street Ry. He was a graduate of Cornell University and of the Massachusetts Institute of Technology.

J. C. ALLISON, former chief engineer of the California Development Co., predecessor of the Imperial Irrigation District, died last week at the age of 52. Mr. Allison, in recent years a resident of La Jolla, near San Diego, was well known throughout southern California as a consulting engineer on water resources and irrigation. In the early days he worked with Col. Holabird in the development of irrigation facilities for Imperial Valley; he was a member of the consulting firm of Allison and Entenmann, Los Angeles, and later became interested in the development of large tracts of irrigable land in Mexico. At the time of his death he was president of the San Diego Municipal Warehousing Corporation.

WILLIAM J. BOGRETTE, for many years construction engineer for Swift & Company, Boston, died at his home in Medford, Mass., on May 29 at the age of 48.

JAMES W. HOWARD, president of the Howard inspection and testing laboratory at East Orange, N. J., died on May 24 at the age of 75. Colonel Howard was a graduate of Rensselaer Polytechnic Institute and also studied in France, Germany and Switzerland. He was at one time on the editorial staff of *Municipal Engineering* and the *Municipal Journal*.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING construction awards total $43,305,000 for the week, of which $15,619,000 is private work and $27,686,000 public. Of the public, $2,903,000 represents federal and $24,783,000 state and municipal. Corresponding values for a year ago are: total, $19,672,000; private, $8,586,000; public, $11,086,000; federal, $3,003,000 and state and municipal, $8,083,000.

Industrial buildings, public buildings, sewerage, highways and unclassified construction score gains this week. The classification totals are: industrial buildings, $7,153,000; commercial buildings, $5,452,00; public buildings; $8,251,000; sewerage, $2,305,000; highways, $10,970,000; bridges, $2,826,000; waterworks, $2,016,000; earthwork, drainage, $699,000; unclassified, $3,633,000.

The larger projects include: paper mill, W. Va. Pulp and Paper Co., New York, at Charleston, S. Car., $5,000,000; Spanish Village for Chapman Estate, Los Angeles, Calif., $600,000; building for Home Owners Loan Corp., Washington, D. C., $1,447,000; highways, Minnesota, $504,000; Missouri, $770,000; North Carolina, $938,000; South Carolina, $651,000; Iowa, $1,395,000; approach embankments Vermont side of bridge over Lake Champlain, Missiquoi Bay Bridge Commission, Vermont, $373,000; bridges, Pennsylvania, $303,000; Illinois, $672,000; waterworks system, Cicero, Ill., $924,000; South Catamount Dam, Colorado Springs, Colo., $504,000; West Towns Outlet Sewer, Contract 1, Chicago, Ill., $1,211,000; pipe line, Texas Empire Pipe Line Co., Tulsa, Okla., $2,500,000.

State and municipal bond sales for construction total $6,266,000 for the week and corporate securities sales $12,000,000. A PWA railroad loan for railroad flood rehabilitation raises this week's new capital to $20,266,000.

CONTRACTS
(Thousands of Dollars)

	Weekly Average June 1935	Prev. 4 Weeks	Week June 4 1936
Federal Government	$6,704	$3,008	$2,903
State and Municipal	11,161	22,797	24,783
Total public	$17,865	$25,805	$27,686
Total private	9,675	9,509	15,619
Week's total	$27,540	$35,314	$43,305
Cumulative to date:			
1935	$566,782,000	1936	$980,763,000

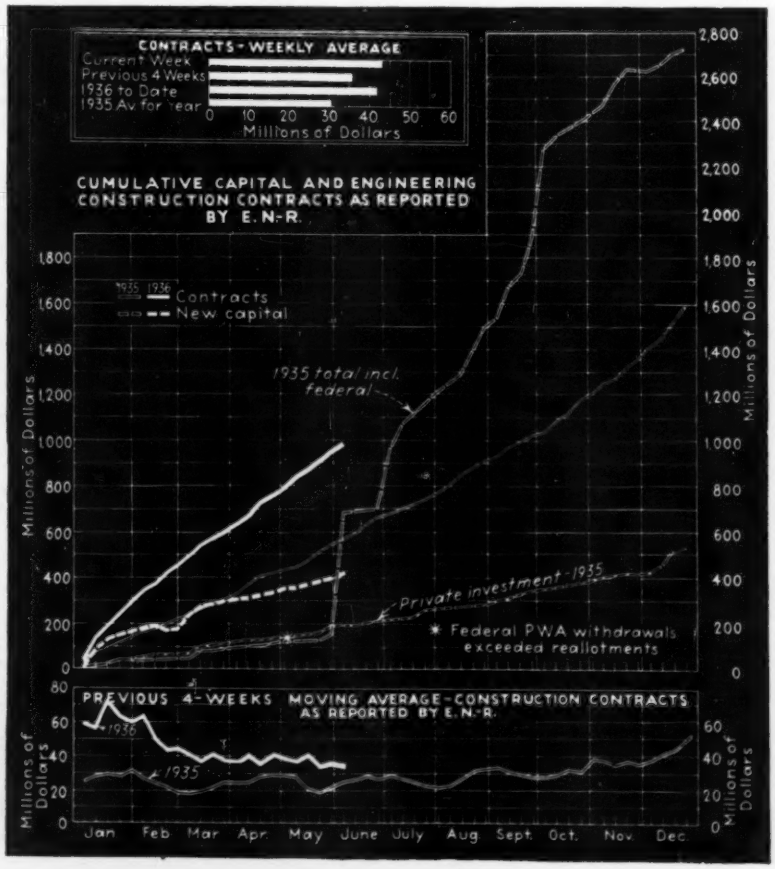
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1936	Week June 4	Cumulative
State and municipal	$6,266	$245,469
PWA non-federal	....	36,183
RFC loans	....	12,008
Corporate issues	12,000	115,813
PWA loans, Private	2,000	3,270
Total Non-Federal	$20,266	$412,743
Federal	....	4,955
Total new capital	$20,266	$417,698
Cumulative to date:		
1935	$672,597,000	1936	$417,698,000

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
June, 1936	204.60	93.35	May, 1936	149	65
May, 1936	203.40	97.77	Apr., 1936	166	73
June, 1935	194.78	93.63	May, 1935	130	57
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47


CONTRACTS - WEEKLY AVERAGE
Current Week
Previous 4 Weeks
1936 to Date
1935 Av. for Year
0 10 20 30 40 50 60
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1935 1936
Contracts
New capital
1935 total incl. federal
Private investment - 1935
* Federal PWA withdrawals exceeded reallotments
Millions of Dollars
PREVIOUS 4-WEEKS MOVING AVERAGE - CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1936
1935
Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

BUSINESS SIDE OF CONSTRUCTION

May Awards Gain 15 Per Cent Over 1935—Cost Index Rise Continues

ENGINEERING construction volume in May fell below the rate for the first four months but shows an increase of 15 per cent over last May. The 1936 values, for a 4-week month, are total, $141,257,000; private, $38,037,000; public, $103,220,000; federal, $12,031,000. The corresponding values for May, 1935, a 5-week month, are total, $122,827,000; private, $41,680,000; public, $81,147,000 and federal, $20,288,000.

Federal awards in May are the highest this year since January but below last year. Private and state and municipal awards are below last month but ahead of last year.

Commercial and public buildings show strong gains over a year ago as do highway awards. Industrial buildings awards are lower for May.

Territorially, Middle Atlantic and West of Mississippi held their strong gain over last year, Middle West dropped below the peak May volume of a year ago, South and New England equalled last year's volume and Far West registered a gain over last year. The distribution of volume is: New England, $10,652,000; Middle Atlantic, $51,447,000; South, $11,123,000; Middle West, $22,881,000; West of Mississippi, $27,852,000; Far West, $17,302,000; U. S., $141,257,000.

New Capital

State and municipal bond sales in May reached the highest total this year, $61,122,000. Included in this volume is $13,461,000 which is not new financing but which represents a transfer from federal to private investment financing through the sale of PWA bonds. Corporate securities for the month totaled $21,579,000.

Materials

Cement—The Portland cement industry in April, 1936, produced 8,519,000 barrels, shipped 9,089,000 barrels from the mills, and had in stock at the end of the month 20,556,000 barrels. Production and shipments of Portland cement in April, 1936, showed increases, respectively, of 38.8 and 46.6 per cent, as compared with April, 1935. Portland cement stocks at mills were 3.1 per cent lower than a year ago, according to reports received by the Bureau of Mines.

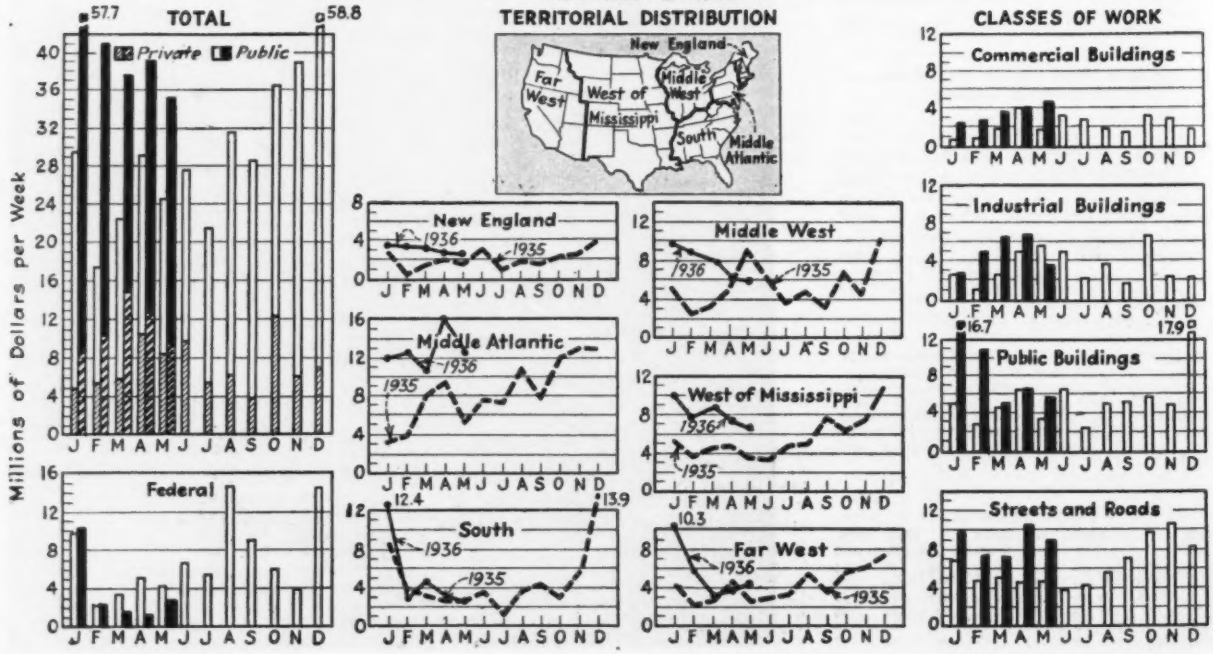
ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN MAY, 1936

Four Weeks—Thousands of Dollars (000 Omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States May 1936	United States Five Months 1936	United States Five Months 1935	Canada May 1936
Public Works										
Waterworks	749	1,373	49	595	1,873	2,298	**6,937**	53,422	31,518	.....
Sewerage	362	1,907	311	3,144	1,032	117	**6,873**	63,778	28,358	98
Bridges, public	446	6,161	843	3,503	4,284	1,391	**16,628**	70,923	27,990	90
Earthwork and waterways	62	414	149	60	3,220	570	**4,475**	63,963	75,377	53
Streets and roads	4,444	7,547	4,197	5,264	10,989	3,695	**36,136**	196,622	113,753	113
Buildings, public	2,623	8,976	1,491	3,183	4,625	2,570	**23,468**	199,710	97,661	140
Unclassified, public	204	4,298	387	2,433	270	1,111	**8,703**	44,988	22,286	146
Total public	8,890	30,676	7,427	18,182	26,293	11,752	**103,220**	693,406	396,943	640
Federal gov't (included in above classifications)	721	2,468	870	2,216	4,640	1,116	**12,031**	88,334	110,128	.....
Private										
Bridges, private	.....	400	23	.....	17	.....	**440**	3,937	5,433	.....
Buildings, industrial	1,462	5,042	1,829	3,688	703	1,725	**14,449**	106,220	72,292	586
Buildings, commercial	300	14,833	960	815	275	2,261	**19,444**	76,771	39,203	710
Unclassified, private	.....	496	884	196	564	1,564	**3,704**	57,124	33,239	155
Total private	1,762	20,771	3,696	4,699	1,559	5,550	**38,037**	244,052	150,167	1,451
May, 1936 (4 weeks)	**10,652**	**51,447**	**11,123**	**22,881**	**27,852**	**17,302**	**141,257**	.....	.....	**2,091**
April, 1936 (5 weeks)	13,976	80,208	15,401	31,040	35,734	19,099	**195,458**	.....	.....	10,561
May, 1935 (5 weeks)	6,284	26,990	13,382	44,833	17,803	13,535	**122,827**	.....	.....	7,050
Five months, 1936	66,921	282,974	117,896	168,357	179,252	122,058	.....	937,458	.....	33,358
Five months, 1935	34,141	130,006	95,204	113,349	97,359	77,051	.....	.....	547,110	23,029

ENGINEERING CONSTRUCTION REPORTED BY E.N.-R. WEEKLY AVERAGES

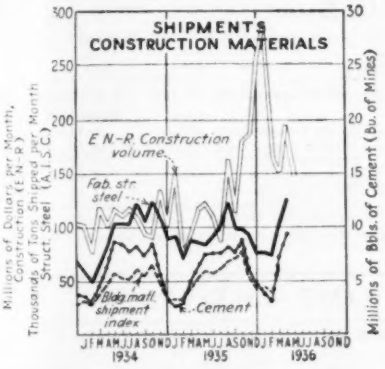
□—1935 ■—1936



The ratio of production to capacity for April was 39.2 compared with 27.9 the previous year and 23.4 the previous month.

Steel—The operating rate of steel companies having 98 per cent of the steel capacity of the industry and reporting to the American Iron and Steel Institute was 69.1 per cent for May, a slight gain over the high rate of 68.5 per cent which was established in April. This rate compares with 42.7 per cent reported for May, 1935.

April bookings for structural steel failed to equal those of the previous month. Total new business closed during the first four months of this year for steel construction averaged 49.5 per cent of normal (normal being the average for the four years, 1928-1931, inclusive), according to the records compiled by the American Institute of Steel Construction. Bookings for the same period last year amounted to 38.1 per cent of normal. Production of fabricated structural steel during April as well as the shipments


SHIPMENTS
CONSTRUCTION MATERIALS
E.N.-R. Construction volume
Fab. str. steel
Bldg. matl. shipment index
Cement
Millions of Dollars per Month, Construction (E.N.-R.)
Thousands of Tons Shipped per Month, Struct. Steel (A.I.S.C.)
Millions of Bbls. of Cement (Bu. of Mines)
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1934
1935
1936

were up, production to 49.2 per cent and shipments to 53 per cent of normal.

Lumber—Lumber shipments ranged during May between 66 and 73 per cent and averaged 70 per cent of the 1929 weekly average and orders during the week ended May 16 were the heaviest of any 1936 week to date, according to reports to the National Lumber Manufacturers Association. Production is exceeding 250,000,000 ft., shipments, 230,000,000 ft. and orders, 230,000,000 ft.

The index of shipments of construction materials, compiled by Advance Construction Programs Unit, Space Control, rose to 63 for April compared with 54 a year ago and with 59 last month.

Building Permits

The dollar value of permits issued in 215 cities of the United States, according to Dun & Bradstreet, Inc., was $83,966,821, against $78,072,223 during March and $51,717,570 in April, 1935. This represents an increase of 7.5 per cent over March, or slightly more than the usual seasonal gain, while the rise over the same month of last year amounts to 62.4 per cent. The April building permit volume was the largest recorded since August, 1931, and marked the sixteenth consecutive month to show an increase over the corresponding period of the previous year.

Labor

Employment in the production of six major construction materials as reported by Advance Construction Programs Unit, Space Control, is 49.7 for April compared with 46.4 in March and 41.2 in April a year ago.

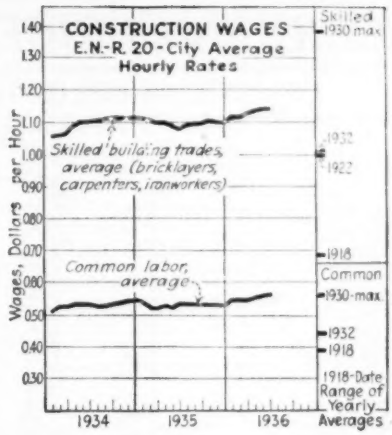
Reports received by the Bureau of Labor Statistics, U. S. Department of Labor, from 9,558 contractors engaged in private building construction showed gains of 15.6 per cent in employment and 20.3 per cent in payrolls. The April increases were particularly pronounced in the "flood" areas due to repairs necessitated by damage from the high water in March. The information furnished by reporting contractors related to employees engaged in erecting, altering, and repairing private buildings and does not include projects financed by the Public Works Administration, Reconstruction Finance Corporation funds or regular appropriations of the Federal, State, and local governments.

There were approximately 3,320,000 workers engaged during the month ending April 15 on the work programs financed from the Emergency Relief Act of 1935. Compared with the previous month this is a decrease of approximately 115,000. Of the total number more than 2,825,000 were working on projects operated by the Works Progress Administration.

The Public Works Administration program provided employment for nearly 260,000 workers in April. This includes approximately 110,000 employees working on projects financed from E.R.A.A. 1935 funds. These employees are also included under the Works Program. This is an increase of more than 58,000 compared with employment in the preceding month.

There were more than 154,000 workers employed in April in the construction and maintenance of roads financed wholly from State funds. Compared with the previous month this represents an increase of 13,000 in the number of workers employed.

Employment in the construction industry in New York State started its usual spring recovery in March. A return of more favorable weather conditions combined with an increase in activity caused a rise of 26 per cent in employment. Payrolls advanced 34 per cent and man-hours, 32 per cent. Highway contractors reported the greatest increase in employment, a rise of 54 per cent. General building contractors increased their forces by 34 per cent, miscellaneous general contractors by 23 per cent, and subcontractors by 19 per cent, according to reports of Division of Statistics and Information, State Department of Labor.



Skilled labor rates in Detroit were increased about 20 per cent on the new Western High School, ending a 6-weeks' strike. The Detroit Building Trades Council claimed that the rates originally set up were not equal to prevailing wage rates.

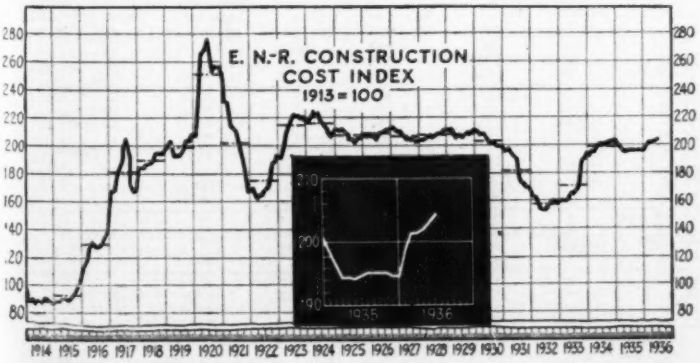
Average wage rates on WPA projects throughout the country showed a slight rise for the first half of April compared with the same period in March according to report of the Works Progress Administrator. The April wage rate for all projects averaged 43.8 cents an hour as compared to 43 cents for the first half of March. Hourly wage rates increased in thirty-nine States, remained stationary in Delaware and New York City at 68.2 cents an hour, and decreased in eight States. The New York City average was the highest in the nation.

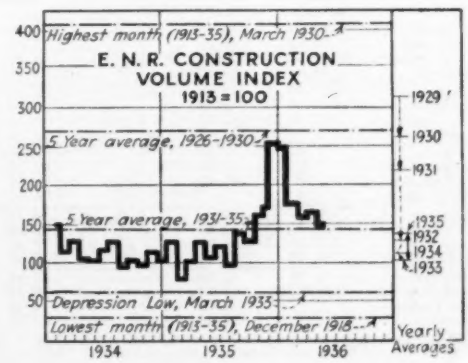
ENR Cost and Volume Index

THE *Engineering News-Record* Construction Cost Index is 204.60 for June. The increase is due to an increase in the common labor wage average.

The *ENR* Volume Index is 149 for May.

	INDEX NUMBER					
ENR Cost		1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
June, 1936		**204.60**	**93.35**	**May, 1936**	**149**	**65**
May, 1936		203.40	97.77	Apr., 1936	166	73
June, 1935		194.78	93.63	May, 1935	130	57
1935 (Av.)		195.22	93.84	1935 (Av.)	135	58
1934 (Av.)		198.10	95.23	1934 (Av.)	114	50
1933 (Av.)		170.18	81.80	1933 (Av.)	102	47





CURRENT PRICES OF CONSTRUCTION MATERIALS

CEMENT, AGGREGATES AND READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT (Per bbl., carload lots, including 40c. per bbl. for bags, cash discount not included)			SAND AND GRAVEL (Per ton, carload lots)			CRUSHED STONE (Per ton, carload lots)		CRUSHED SLAG (Per ton, carload lots, f.o.b. plant)		CONCRETE (Ready-Mixed 1:2:4, 5 sk./cu. yd. or more, delivered)
	Cloth Bags*	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	
Atlanta	$2.83	$2.58	$2.50	$1.60	$1.60	$1.55	$1.69	$1.92	$1.69	$1.69	$8.50
Baltimore	2.66	2.41	2.21	1.80‡	1.80‡	1.30‡	1.80‡	1.80‡	1.80	1.80	7.35
Birmingham	2.40	2.15	1.95	1.80	1.80	1.45	1.00	1.00	.90	1.15	5.45
Boston	2.42	2.17	1.92	1.40	1.40	.90	1.40	1.40	.....	.....	6.50
Chicago	2.60	2.35	2.20	1.50	1.50	1.80	1.80	.....	1.00	1.00	.....
Cincinnati	2.50	2.25	2.05	1.20	1.20	1.30	1.80	1.80	.....	.....	6.70
Cleveland	2.41	2.16	.....	1.40	1.40	1.30	1.60	1.60	1.75	1.75	7.15c
Dallas	2.45	2.20	2.00	1.55	1.55	1.30	1.95	2.05	.....	.....	7.00c
Denver	3.09	2.84	.....	1.20	1.40	.90	.....	.....	.....	.....	.....
Detroit	2.25	2.00	1.80	1.20	1.20	1.00	1.45	1.70	1.35‡	1.45‡	5.95
Kansas City	2.51	2.26	2.06	.....	1.85	1.25	1.85	1.80	.....	.....	7.65
Los Angeles	2.32	2.12	.....	1.20	1.20	.90	1.20	1.20	.....	.....	6.31
Minneapolis	2.90	.....	2.45	1.00p	1.00p	.25p	1.00p	1.00 p	.....	.....	7.00d
Montreal	.....	1.70	.....	.85	.90	1.25	.85	1.20	.....	.....	4.50f
New Orleans	2.47	2.22	2.00	1.50	1.50	1.25	.....	.....	.....	.....	8.25
New York	2.70‡	2.45‡	.....	1.20‡k	1.20‡k	.70‡k	1.75‡k	1.85‡k	.....	.....	8.00
Philadelphia	2.68	2.43	2.23	1.45‡	1.55‡	1.15‡	2.60‡	2.75‡	1.00‡	1.00‡	8.00D
Pittsburgh	2.46	2.21	1.61	1.50‡	1.50‡	1.70‡	2.25‡	2.25‡	1.50	1.50	7.00
St. Louis	2.53	2.28	.....	1.55‡	1.40‡	1.40‡	.75v	.75v	.65/.95§	.50/.95§	6.80
San Francisco	2.72	2.52	2.20	1.35	1.35	1.35	1.50	1.50	.....	.....	7.53
Seattle	2.95	2.70	.....	1.00	1.00	1.00	1.44	1.44	.....	.....	6.75

*10c. allowed for each returnable bag. †Per cu. yd. ‡Delivered. §F.o.b. Granite City, Ill. kBarge lots alongside dock. vf.o.b. plant. fOver 5 tons or more. pWithin 3-mi. from Pub. Square. dTon. D Discount 35c. 500 to 2000; 70c. 2000 to 5000; 95c. over 5000.

CURRENT MAXIMUM PRICES RECEIVED AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Alpena, Mich.	$1.50	$1.45	Ironton, Ohio	$1.50	$1.45	North Birmingham, Ala.	$1.75	$1.70
Buffington, Ind.	1.70	1.65	Iola, Kans.	1.70	1.65	Richard City, Tenn.	1.85	1.80
Crestmore, Calif.	1.72	.....	La Salle, Ill.	1.70	1.65	Saginaw, Mich.	1.50	1.45
Dallas, Tex. (Inc. 5c. tax)	1.80	1.75	Limedale, Ind.	1.70	1.65	Steelton, Minn.	1.80	1.75
Hannibal, Mo.	1.70	1.65	Mason City, Ia.	1.70	1.65	Universal, Pa.	1.65	1.60
Hudson, N. Y.	1.75	1.70	Norfolk, Va.	1.76	1.71	Waco, Tex. (Plus 5c. Tax in Texas)	1.75	1.70
Independence, Kans.	1.70	1.65	Northampton, Pa.	1.65	1.60	Wyandotte, Mich.	1.45	1.40

Cash Discounts, Cement, to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount, 10c. per bbl. for payment within 15 days of date of invoice.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED (Per M, lots of 2,000 pieces or over, 3x12x12 in.)	(4x12x12 in.)	(8x12x12 in.)	STRUCTURAL CLAY TILE—LOAD BEARING—SCORED (Per M, lots of 2,000 pieces or over, 8x12x12 in.)	(10x12x12 in.)	(12x12x12 in.)	BRICK (Per M, in quantity, Common backing)	(Straight hard)	LIME (Per ton, Hydrated finishing)	(in paper, Common hydrated)	(carload lot, Pulverized or lump)
Atlanta	$71.10	$75.80	$142.10	$170.50	$199.00	$227.40	$12.00	$14.25	$18.50	$13.00	$13.00
Baltimore	90.00	95.00	180.00	210.00	300.00	375.00	13.00	17.00	20.00	14.00	25.00
Birmingham	78.75	84.00	157.50	189.00	201.25	242.00	15.00	19.00	2.50§	1.50§	2.00g
Boston	84.40,i	90.00,i	168.75,i	191.25,i	246.75,i	282.00,	14.50	18.00	19.00	14.75	3.30g
Chicago	66.00	70.40	132.00	174.30	214.40	245.00	10.20	11.20	18.00	13.40	14.00
Cincinnati	55.00	58.70	110.00	124.10	164.20	187.70	17.50	17.50	15.97	12.48	.....
Cleveland	45.00	48.00	90.00	108.00	138.50	158.50	15.00	15.00	16.00k	14.00k	2.65kp
Dallas	72.00	75.00	149.00	177.00	217.00	269.00	13.50	26.00	19.00	16.00	1.65p
Denver	78.50	88.00	141.50	166.50	196.00	225.00	11.50	15.00	30.00	22.00	22.50
Detroit	71.85	76.65	143.70	230.00	280.00	325.00	12.50	13.50	18.00	15.00	15.25
Kansas City	72.50	75.50	92.00*	140.50	177.75	207.25	15.00	24.00	18.00	12.40	14.20*
Los Angeles	77.50	94.25	134.00*	188.00	232.50	311.50	11.50	14.00	18.70	.....	19.70
Minneapolis	80.15s	85.50s	145.40s	167.75s	175.25s	243.70s	13.10	15.10x	25.50	21.00	23.00
Montreal	79.10s	90.40	169.50s	.....	212.40	136.60	20.75	31.00	15.00	10.00	7.00
New Orleans	69.10	69.10	129.50	155.40	203.40	251.80	14.00	.....	18.90	11.35	.....
New York	78.40	83.60	125.40*	193.30†	238.80†	295.60†	12.50	.....	20.00	15.50	20.00
Philadelphia	86.00	90.00	150.00	200.00	240.00	280.00	18.00	20.00	16.35	11.25	10.75
Pittsburgh	58.40c	62.30c	116.85c	165.00c	217.00c	250.00c	16.50	25.00	17.20	14.50	2.22p
St. Louis	62.00	65.00	120.00	180.00	234.00	280.00	15.00	18.00	22.00	16.00	2.25p
San Francisco	84.00	94.50	225.00	.....	.....	.....	15.00	18.00	22.11	21.50	2.05p
Seattle	84.00	95.50	180.00	198.00	.....	.....	15.50d	18.50	30.00	20.00	28.60r

*6x12x12 in. †F.o.b. Perth Amboy, N. J. ‡Per sack. §Per bbl., 200 lbs. pPer bbl. 180 lbs. gper bbl. 280-lb. kLCL. dless $1 cash 15 days. rlump. sSmooth. xSelected common. iCarload lots delivered to job.

ROAD SURFACING MATERIALS—F.O.B. CITY

	PAVING BRICK AND BLOCKS (Granite per M, lots of 50,000, 4x4x8 in.)	(Brick per M, 3x4x8½ in., carload lots)	(Wood per sq. yd., 3½ in., 16-lb. treat.)	PAVING ASPHALT (Per ton, less than 80 penetration, Tank car)	(Drums)	ASPHALT BINDERS—FLUXES (Per gal., 80-300 penetration, Tank car)	(Drums)	CUTBACK ASPHALT (Per ton, Tank car)	(Drums)	ROAD OILS (Per gal., Tank car)	ASPHALT EMULSION (Per gal., Tank car)	(Drums)
Atlanta	$ 75.00	$35.00	$2.25	$18.20z	$23.41z	$0.728z	$0.999z	$19.20z	$27.22z	$0.668z	$0.0875	$0.0875
Baltimore	110.00	44.00	2.25	17.00	22.00	.075	.10	.09†	.125†	.....	.....	.....
Birmingham	110.00	25.00	.....	19.00	24.00	.0878	.1128	.10†	.137†	.....	.06	.....
Boston	78.00	26.00	2.75	17.00	22.00	.07e	.095e	.09†e	.12†e	.07e	.095e	.125e
Chicago	125.00	42.00	2.28	16.00	20.00	15.00	19.00	.07	.11	.055	.09	.135
Cincinnati	115.00	37.00	.....	13.47	17.47	.12	.....	17.00	.....	.055	.08	.....
Cleveland	100.00‡	32.75	2.85	16.50	20.00	.065	.075	.0625	.04†	.05	.08	.09
Dallas	.....	30.00	.....	16.50	21.00	.065	.16	17.50	25.00	.055	.10	.105
Detroit	.....	37.00	.....	16.80z	21.00z	.....	.....	15.25	20.25	.055	.11	.15
Kansas City	.....	45.00	.....	18.50	23.50	17.50#	22.50#	.077†	.107†	.057	.11	.15
Los Angeles	.....	50.00	.....	10.34	14.50	10.34#	14.50#	10.34	.....	.042	.06	.12
Minneapolis	.....	.....	1.75l	18.20	24.70	.098	.098	21.85	34.65	.048	.....	.....
Montreal	70.00	60.00	3.62	14.00	19.60	.07	.093	19.00	26.50	.07	.135	.165
New Orleans	100.00	32.00	.....	15.00	18.75	.068	.095	.075†	.10†	.....	.0785	.11
New York	130.00§	65.00	2.64	17.00	22.00	.075	.10	.09†	.125†	.....	.075	.11
Philadelphia	110.00	45.00	2.25	13.50	18.00	.05	.08	.05†	.08†	.045	.08	.....
Pittsburgh	115.00	40.00	.....	19.00	24.00	.0775	.1125	.086†	.121†	.0675	.....	.....
St. Louis	40/115.00	35.00	.....	19.50	24.50	.08	.11	.085†	.115†	.045	.09	.12
San Francisco	.....	50.00	.....	12.00	18.00	12.00#	18.00#	12.50#	23.00#	.04	.0575	.117
Seattle	.....	35.00	.....	25.50	25.50	17.00#	23.00#	15.00	.....	.03	.19	.20

Note: Paving asphalt, tank car or boat, f.o.b. Maurer, N. J., per ton, Bermudes, $25.00; Trinidad, $21.00. *Per sq. yd. †Per gallon. ‡4½x6x5½ in. §4x5x9-in. Av. zMexican. lLocal reduction due to 20% reduction intra-state class freight rates, only Georgia affected. l 2½ in. 6 to 8-lb. treatment. e F.o.b. Everett

CURRENT PRICES OF CONSTRUCTION MATERIALS

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS	RIVETS	WIRE NAILS	SHEET PILING	STEEL RAILS (Per Gross Ton)			TRACK SUPPLIES			
		¼-in. billet,	½-in. structural	Base	Base	Standard	Light	Re-rolled	Angle bars	Std. spikes	Tie plates	Track bolts
Birmingham	$1.95	$2.10	$3.00	$2.55	.....	$36.375	$36.37	$35.00	$2.55	$2.60	$1.90	$3.60
Chicago	1.85	2.10	3.00	.....	$2.25	36.375	35.00	34.00	2.55	2.60	1.90	3.60
Pittsburgh	1.80	2.05	2.90	2.10	2.15	36.375	35.00	34.00	2.55	2.60	1.90	3.60

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

F.O.B. WAREHOUSE	STRUCTURAL SHAPES	REINFORCING BARS (Per 100 lb., ¼ in., base price)		EXPANDED METAL LATH (Per 100 sq.yd., carload lots)		WELDED FABRIC REINFORCING (Per 100 s.f., carload lots)			SHEET PILING
	Per 100 lb., base price	New billet	Rail steel	Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in., No. 6 & 6 wires Per sq.yd.	Per 100 lb. base price
Atlanta	$3.36	$2.34	$2.19	$21.00	$23.00	$1.53	$1.16	$0.1449	$2.70
Baltimore	3.00	2.75	2.60	24.00	26.00	1.41	1.08	.1332	2.45
Boston	3.54	2.923	1.925	21.00†	23.00†	1.46	1.12	.1449	2.60
Chicago	3.20	2.10	1.95	22.00	24.00	1.40	1.08	.1323	2.25
Cincinnati	3.40	3.25	3.25	25.01	29.50	1.39	1.07	.1287	.....
Cleveland	3.31	2.75	2.60	20.00	22.00	1.37	1.06	.1287	.....
Dallas	3.82	3.05	2.90	21.00	28.00	1.63	1.23	.1548	3.005
Denver	3.95	3.76	3.61	22.00	25.00	1.68	1.26	.1584	.....
Detroit	3.42	2.20	2.05	20.00†	22.00†	1.41	1.08	.1323	2.43
Kansas City	3.75	2.75	2.60	15.50	19.50	1.50	1.14	.1422	2.69
Los Angeles	2.35	2.325	.....	23.00	27.50	1.68	1.26	.1584	2.65
Minneapolis	3.45	2.86	2.71	22.00	26.00	1.51	1.15	.1431	2.57§
Montreal	2.90	2.40	2.30	32.00	33.00	2.30	1.71	.238	2.80
New Orleans	.....	.....	.....	21.00	24.00	1.54	1.17	.1458	.....
New York	3.37	2.50	2.35	19.50	21.50	1.44	1.11	.1359	2.50
Philadelphia	2.98	3.06	2.22	20.00	24.00	1.42	1.09	.1332	2.46
Pittsburgh	1.80‡	1.85‡	1.70‡	20.00‡	22.00‡	1.34	1.04	.1260	2.15
St. Louis	3.45	2.45	2.30	22.00	24.00	1.42	1.09	.1341	2.30
San Francisco	3.15	2.475	2.325	23.00	28.00	1.68	1.26	.1584	2.60
Seattle	3.55	2.50	.....	24.50	26.50	1.68	1.26	.1584	2.60

‡Base Mill Price. Note: Shapes, bars and piling subject to quantity discounts. §Mill Price plus freight to Minneapolis. †f.o.b. delivered.

PAINTING AND ROOFING SUPPLIES—F.O.B.

	RED LEAD Per 100 lb. in 500-lb. lots Dry	WHITE LEAD Per 100 lb. in 500-lb. lots# in oil	READY-MIXED PAINT Per gal., drums Graphite*	Aluminum†	Ferric Oxide‡	ROOFING SUPPLIES Carload lots, f.o.b. factory— Rolls, slate surfaced, 85-90 lb., per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating, per gal.	Tar pitch, 350-lb. bbl., per ton
Atlanta	$7.75	$11.50	$1.60	$3.10	.....	$2.02	$1.81	$1.81	$.36	$25.60
Baltimore	7.00	10.50	1.45	2.45	$1.90	2.25	3.00	3.00	.35	25.00
Birmingham	7.25	11.00	2.35	2.35	1.85	2.01	1.77	1.77	.36	22.00
Boston	7.00	10.50	1.85	2.70	.05x	1.75	3.15	3.15	.43	22.00
Chicago	7.00	10.50	1.35	.....	.....	1.83	2.30	2.30	.38	22.00
Cincinnati	7.00	10.50	1.45	2.50	1.40	2.40	2.39x	2.39x	.36	21.00
Cleveland	7.00	10.50	1.65	2.30	1.40	1.83	1.61x	1.61x	.25	20.00
Dallas	7.25	11.50	1.80	2.10	.....	2.35x	3.80	3.80	.14	35.00
Denver	7.50	11.25	2.55	.....	.....	2.25	3.55	3.55	.35	30.00
Detroit	7.00	10.50	1.65	2.30	1.40	2.55	2.80	2.55	.35	30.00
Kansas City	7.00	10.62½	1.25	2.65	1.00	2.05	3.10–3.20	3.10–3.20	.25	24.50
Los Angeles	7.25	10.75	1.60	2.25	2.30	2.00	1.50	.....	.45	.....
Minneapolis	7.00	10.62½	.....	.....	.....	1.78v	1.52x v	1.52x v	.29	23.30
Montreal	.....	8.20	1.85	3.50	1.85	1.90	2.44	1.88	1.55§	1.52§
New York	7.00	10.50	1.75	2.35	1.40	1.75	1.61x	1.61x	.232	22.00
Philadelphia	7.00	10.50	2.50	2.95	1.50	1.68	1.86x	1.48x	.37	22.00
Pittsburgh	7.00	10.50	1.05	1.95	.80	1.75	1.65x	1.65	.38	25.00
St. Louis	10.00	10.50	1.85	2.45	1.30	1.83x	2.57	2.57	.25	25.00
San Francisco	7.25	10.75	1.80	2.75	1.10–2.00	1.89	3.10	3.10	.38	26.00
Seattle	7.25	10.75	1.80	2.85	2.20	3.30	2.66	2.60	.60	30.00

*U. S. War Dept. Spec. 3-49A. †ASTM Spec. D266-31. ‡80% maximum ferric oxide. §Per 100 lb. xPer lb. vMinneapolis & vicinity
Note: Red lead in oil 50c higher than white lead in oil. #Basis of quoting changed this month from list to 500-lb. lots.

MISCELLANEOUS ITEMS

	WINDOW GLASS Discounts from latest jobbers List, Sept. 15, 1928 Single or Double Thickness A quality	B quality	EXPLOSIVES Per lb. dynamite delivered 50-lb. cases Gelatin 40%	60%
Atlanta	85%	85%	$0.155	$0.17
Baltimore	88%	90%	.145	.16
Birmingham	88%	90%	.095	.11
Boston	88–10–5%	90–10–5%	.165	.185
Chicago	88%	89%	.135	.15
Cincinnati	89–10%	91–10%	.27	.29
Cleveland	89%	89%	.20	.215
Dallas	87%	89%	.1675	.1825
Denver	86%	88%	.155	.17
Detroit	87–10%	89–10%	.225	.240
Kansas City	86–10%	87–10%	.16	.175
Los Angeles	90%*	90–40%	.1725†	.1925†
Minneapolis	86%	88%	.175	.19
Montreal	60–30%	70–5%	.1875	.2125
New Orleans	88%	90%	.215	.23
New York	89%	90%	.225	.24
Philadelphia	88%	90%	.1550	.17
Pittsburgh	88%	88%	.11	.1250
St. Louis	89%	89%	.115 & .13	.13 & .145
San Francisco	80%	85%	.1575	.1775
Seattle	90–10%	90–20%	.1425	.1575

*Disc. from list Aug. 1, 1929. †F.o.b. Arsenal. ‡Double thickness A & B.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York.

Bleaching powder, in drums, F.o.b. works, per 100 lb.	$2.00–$2.10
Calcium chloride, 77-80%, flaked, in 400-lb. drums or 100-lb. moisture proof bags, f.o.b. works, freight equalized with points of competition, per ton	22.00–35.00
Chlorine cylinders, per lb. delivered	.055–.06
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.35
Soda ash, 58%, in paper bags, per 100 lb. dense	1.25
Sulphate of aluminum, commercial, in 100 lb. bags per ton	27.00–30.00
Sulphate of copper, in bbl., per 100 lb.	4.00–4.25

PILES

Prices per linear foot, pine, with bark on, f.o.b. New York; delivered from barge 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Short Leaf Barge	Short Leaf Rail	Long Leaf Barge	Long Leaf Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.12	$0.165	$0.13	$0.16
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.16	.21	.15	.20
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.17	.225	.16	.21½
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.195	.235	.20½	.24½
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.2125	.245	.24½	.30½
14 in.—2 ft. from butt	5 in.	80 to 85 ft.	.275	.385	.....	.....
14 in.—2 ft. from butt	5 in.	85 to 89 ft.	.315	.452	.....	.....

RAILWAY TIES

Prices f.o.b., per tie, for carload lots:		6 In. x 8 In. by 8 Ft.	7 In. x 9 In. by 8½ Ft.
Boston	Oak, untreated	$1.10	$1.60
	Pine, untreated	1.25	1.70
	Pine, creosoted	1.65	2.30
New York	Long-leaf sap pine, untreated	.80	1.00
	Mixed oak, untreated	1.00	1.20
	White oak, untreated	.75	1.25
Birmingham	Red oak, creosoted	1.40	1.60
	Southern pine, untreated *6x8x8'6'	.45*	.60
	Southern pine, creosoted	1.00*	1.25
Chicago	White oak, untreated	1.15	1.40
	Oak, empty cell, creosoted	1.50	1.88
	Oak, zinc treated	1.40	1.70
	Southern pine, creosoted	1.35	1.78
Los Angeles	Fir, untreated	.50	.72
	Fir, creosoted	1.67	2.40
Philadelphia	Red oak, untreated	1.00	.....
	Red oak, creosoted	.....	2.10
	White oak, untreated	1.13	1.45
St. Louis	Red oak, untreated	1.10	1.40
	Red oak, creosoted	1.50	1.95
San Francisco	Sap Pine or cypress, untreated	.95	1.30
	Douglas fir, green, untreated	.45	.65
	Douglas fir, empty cell, creosoted	1.14	1.56
Montreal	Birch or maple, untreated	1.00	1.10
	Birch or maple, creosoted	1.25	1.55

CURRENT PRICES OF CONSTRUCTION MATERIALS

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE	VITRIFIED SEWER PIPE				CLAY DRAIN TILE		CONCRETE SEWER PIPE		WROUGHT STEEL PIPE			
										Full standard weight. #			
	Per net ton, f.o.b. 6 in. to 24 in.*	Per foot, delivered, ASTM C 13-35 8 in., s.s.	12 in., s.s.	24 in., d.s.	36 in., d.s.	Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	Per ft., delivered; ASTM C 14-35 12 in.	24 in.	1 to 3 in., Black	Butt Weld Galv.	3½ to 6 in., Lap Weld Black	Galv.
										%	%	%	%
Atlanta	$43.00	$0.225dl	$0.405dl	$1.4625l	$4.50l	$80.00	$128.00	$0.40	$1.25	49.5	40.5	47	37
Baltimore	46.50	.24	.46	2.10	5.75	110.00	170.00	.75	2.00				
Birmingham	39.00	.25	.45	1.625	4.66	85.00	220.00	.45	1.60	69.5	61.5	67	58
Boston	46.50	.224	.432	1.98	5.845	99.00	153.00	.40	2.35				
Chicago	47.50	.245	.4725	2.025	4.60	60.00	120.00	.36	1.42	58.75	48.75	55.625	45
Cincinnati	46.00	.189	.3645	1.62	5.535	69.00	108.00	.40	1.40	58.75	48.75	55.625	45
Cleveland	47.50	.182	.351	1.62	4.8175	42.50	88.50	.35	1.74	61	51	57.9	47
Dallas	51.00	.35	.67	2.70	.....	165.00	260.00	.46	1.57	64	55	64	56
Denver	59.00	.27‡	.47‡	1.98‡	.....	105.00	180.00	.....	.....	50	40	47	36
Detroit	47.50	.203	.3915	1.71	5.2375	82.00	136.00	.35	1.20	.....	.....	.....	.....
Kansas City	49.00	.30	.54	2.16	5.00	120.00	140.00	.40	1.50	55	45	51.5	41
Los Angeles	47.50	.2825‡	.508‡	2.03‡	5.535‡	115.50	192.50	1.00	2.00	62.1	54.1	59.6	51
Minneapolis	49.50	.24‡	.432‡	1.728‡	4.60†	.....	.....	.65	1.65	.....	.....	.....	.....
Montreal	50.00	.33‡	.59‡	2.04‡	.....	82.00	134.00	.51	2.048	.....	.....	.....	.....
New Orleans	45.00	.23	.41	1.60		67.00	.....	.45	1.65				
New York	46.00	.28	.55	2.35	6.35	.....	.....	.55	2.00	57.50e	47.50e	54.375e	43.25e
Philadelphia	43.00	.336	.648	2.835	8.68	175.00	210.00	.54	1.80	52.37e	41.35e	53.39e	42.57e
Pittsburgh	49.00	.182‡	.351‡	1.62‡	4.92‡	69.00	108.00	.75c	1.75	69.5	61.5	67	58.5
St. Louis	46.00	.255	.459	1.836	3.96	85.00	170.00	.80	2.00	51.266	43.245	52.49	41.47
San Francisco	47.00	.29L	.522L	2.088L	5.67L	103.50	172.50	.45	2.20	53.69	47	50	39
Seattle	48.50	.4225	.63†	3.06†	7.55†	85.00	200.00†	.50†	1.80	65.80	57.25	66.75	56.30

*b. & s. class B and heavier, C/L lots, 200 tons and over. Burlington, N. J. (base) $43.00. Gas pipe and class A, $3 per ton additional. 4-in., $3 per ton additional. 30 in. and larger usually $2 per ton less.

#Discounts from standard list for delivery from warehouse, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ¼ in., 8½c; ⅜ in. 11½c.; ½ in. 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92.

‡f.o.b. †Less 30% in C/L Lots. c Concrete Culvert pipe reinforced. dDouble strength. lList to dealers. L list. tSales & municipal taxes extra

[2]2½ to 3 in. [e]Resale price to consumer, car load lots shipped from mill.

LUMBER AND TIMBER—PER M FT. B.M., CARLOAD LOTS F.O.B.

		SHORT LEAF YELLOW PINE AND DOUGLAS FIR								LONG LEAF Y. P.	
		All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. All Fir planks No. 2 common; Fir timber is No. 1 common. Lengths up to 20 ft.								Merchantable grade up to 20 ft.	
		1x6,#	1x8,#	2x4,§	2x6,#	2x8,#	2x10,#	3x12,#	6x12,#	12x12,#	2x12,#	12x12,#
Atlanta	Southern Pine	$16.50	$16.50	$16.50	$18.50	$18.50	$23.00	$24.00	.....	.....	$38.50	$40.00
Baltimore	Southern Pine	23.50	24.50	27.50	26.50	27.00	29.00	37.50			55.00	58.00
	Douglas Fir	29.50	29.50	28.50	28.50	28.50	29.50	30.50	$32.50	$31.00	.....	.....
Birmingham	Southern Pine	21.00	21.00	22.00	20.00	21.00	23.00	30.00	30.00	28.00	.....	.....
	Long Leaf	22.00	22.00	25.00	24.00	25.00	28.00	45.00	.....	.....	45.00	45.00
Boston	Rooters N.C. Pine	28.00	28.00	33.00†	35.00†	49.00†	60.00†	73.00†			73.00	73.00
	Douglas Fir	27.00	27.00	31.00	33.00	35.00	37.00	41.00	40.00	41.00	.....	.....
Chicago	Southern Pine	29.00	29.50	33.50	32.50	32.50	35.50	45.50	.....	.....	54.50	54.50
Cincinnati	Southern Pine	23.00	25.00	26.00	25.00	25.50	26.50	40.00			31.50	.....
	Douglas Fir							43.50	46.25	46.25		
Cleveland	Southern Pine	33.00	35.00	41.00	35.00	39.00	41.00	52.00	44.00f	46.00f	52.00	64.00§
Dallas	Southern Pine	d28.35	30.60	31.50	29.80	30.15	30.15	50.40	.....	.....	42.75	67.95
Denver	Douglas Fir	42.00	42.00*n	43.00*	43.00*	43.00*	47.00*	52.00*	56.00*	61.50	.....	.....
Detroit	Southern Pine	26.50	26.50	26.50	26.50	27.50	30.00	37.00			31.00	43.50
	Douglas Fir							41.50	41.50	41.50		
Kansas City	Southern Pine	26.50	27.50	26.50	25.50	26.50	28.00	37.00			55.00	62.50
	Douglas Fir	28.50	29.50	30.00	27.50	28.00	30.00	35.00	37.00	37.00	.....	.....
Los Angeles	Douglas Fir	31.00„	31.00„	31.00„	31.00„	31.00„	31.00„	38.00„	48.00y	41.00y	.....	.....
Minneapolis c	Western Pine	45.00*	51.50*	51.00*	41.00*	41.00*	42.00*	59.50*k			58.00*k	.....
	Douglas Fir	42.00*	42.00*	43.00*	43.00*	43.00*	43.00*	55.00*	59.50*	59.50*	.....	.....
Montreal	Spruce	31.25	32.25	28.00	27.00	30.50	39.25	41.00				.....
	Douglas Fir	47.50	53.00	42.50	44.00	44.00	45.75	52.00	52.00	52.00	43.25	.....
New Orleans	Southern Pine	23.50	25.50	28.00	25.00	27.00	25.50	38.00	.....	.....	44.00	54.00
	Douglas Fir	28.50	30.00	33.00	29.00	32.00	33.50	37.00	.....	.....		
New York	Southern Pine	33.00*	34.00*	33.00*	34.00*	34.00*	38.00*	45.00*	.....	.....	70.00*	70.00*
	Douglas Fir			37.00*	37.00*	35.00*	38.00*	40.00*	43.00*	43.00*		
Philadelphia	Southern Pine	30.00	31.00	32.00	32.00	33.00	34.00	36.00			36.00	42.00
	Douglas Fir	45.00	45.00	45.00	45.00	45.00	45.00	45.00	42.00	42.00	.....	.....
Pittsburgh	Southern Pine	30.50	31.90	37.65	33.75	36.52	37.50	47.75			57.50	57.50
	Douglas Fir	38.52	39.70	39.70	38.55	39.10	39.38	53.25	53.25	53.25	.....	.....
St. Louis	Southern Pine	30.50*x	31.50*x	31.50*x	30.00*x	31.00*x	32.00*x	47.00*x				
	Douglas Fir								55.00*x	55.00*x	72.00	71.00
San Francisco	Douglas Fir	20.50t	20.50t	21.00t	21.00t	21.50t	22.50t	22.00t	25.00t	25.00t	.....	.....
Seattle	Douglas Fir	15.50	15.50	15.50	14.50	14.50	14.50	21.00	20.00	20.00	.....	.....

*Delivered. †Spruce. ‡Long-leafed Y.P. §Norway Pine. ‖Northern Pine. =Native. tAt ship's tackle. „Yard prices. d10% Disc. taken off. x5M ft. or less #S4S. xRgh. cContractors in Minneapolis and St. Paul get 15% disc. from list. f Douglas Fir.

CURRENT BUILDING AND CONSTRUCTION WAGE RATES PER HOUR

	Bricklayers	Carpenters	Structural Iron Workers	Hoisting Engineers	Plasterers	Common Labor Building	Common Labor Heavy Const.
Atlanta	$0.70/1.125	$0.40/.90	$0.60/1.25	$0.75/1.50	$0.60/1.00	$0.30/.40	$0.30/.40
Baltimore	1.25	1.10	1.37½	1.25	1.25	.45	.45
Birmingham	1.00	.60/1.00	1.00	1.125	1.00	.30/.40†	.30/.40†
Boston	1.30	.70/1.175	1.20	.90/1.175	1.375	.50/.70	.50/.70
Cincinnati	.80/1.375	.65/1.20	1.25	1.00/1.25	.80/1.375	.45	.45
Chicago	1.50	1.50	1.50	1.50	1.50	.95	.95
Cleveland	1.375	1.25	1.25	1.25	1.375	.82	.82
Dallas	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.25/.40	.25/.40
Denver	1.10	1.10	1.10	.....	.....	.625	.625
Detroit	1.25	.90/1.00	1.125/1.25	1.00/1.25	1.25	.50/.75	.50/.75
Kansas City	1.325	1.125	1.25	1.25	1.325	.70	.45/.50
Los Angeles	1.10	1.10	1.125	1.125	1.25	.50	.60
Minneapolis	1.00/1.25	.85/1.00	1.00/1.25	.85/1.25	1.00/1.25	.50/.675	.50/.675
New Orleans	1.00	.75	1.00	1.00	1.25	.30/.40	.30/.40
New York	1.50	1.40	1.475/1.65	1.50/1.5625	1.50	.82½	.50/.80
Philadelphia	.35/1.50	.65/1.10	.70/1.375	.90/1.00	1.10/1.37	.35/50	.40/.50
Pittsburgh	1.00/1.50	1.00/1.25	1.00/1.375	1.00	1.00/1.50	.70	.50
St. Louis	1.50	1.25	1.47	1.35/1.47	1.50	.78½	.35/.78½
San Francisco	1.50*	1.125	1.37½	1.12½	1.25*	.62½	.60
Seattle	1.00	1.00	1.25	1.25	1.25	.60	.60
Montreal	.70	.60	.80	.55	.70	.35	.40

Skilled Avg: (Bricklayers, Carpenters, Ironworkers) $1.138 Common Avg. $0.564 *6-hr. Day . † PWA.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., Los Angeles—Dpt. Water & Power, D. F. Nicklin, purch. agt., 207 South Bway., P.W.A. work contemplated during next 6 months and for which bids will be called as soon as specifications are completed. Bids will be called for installation, additions and replacements to chlorinating equipment, constructing 2 steel tanks, installing 10,100 lin.ft. 52 in. steel pipe line Hayvenhurst Ave. and Roscoe St. to Van Owen St., incl. valves, enamel, etc.; 765 lin.ft. 24 in. steel pipe, Sawtelle Reservoir; 37,300 lin.ft. 24 and 36 in. steel pipe in Van Owen, Cantara and Radford Sts., incl. valves, etc.; constructing Riverside Drive pumping plant; installing 1,400 lin.ft. 40 in. steel pipe, Elysian Reservoir outlet; 5,870 lin.ft. 16 in. c.i. pipe in Ventura Blvd. from Shoup to Woodlake Aves.; 14,540 lin.ft. 16 and 24 in. c.i. pipe in Los Angeles St. from Central Ave. and 7th St.; 2,100 lin.ft. 30 in. steel pipe in Buena Vista pumping plant to San Fernando Rd.; constructing York Blvd. pumping plant; 11,530 lin.ft. steel pipe in Ventura Blvd.; constructing Los Feliz pumping station; Highland Park tank; West Hollywood tank; Mead Reservoir; work on Silver Lake Reservoir outlet; machine shop, warehouse and garage at Independence. Specifications will not be available until completed and until a definite date is set for receiving bids on the above. In the case of pipe lines separate bids will be taken on installation. Bids May 25 for welded steel pipe, Spec. X-17, for Stone Canyon-Western Ave. trunkline.

Idaho, Jerome—W. A. Peters plans developing underground water supply, building from 4 to 6 pumping units and constructing 6 mi. c. i. pipeline. $400,000.

Idaho, Wallace—U. B. Hough, engr., 1503 9th St., Spokane, Wash., submitted report to City, recommending 6 in. mains in 2nd St., from Pine to Cypress Sts., and on 5th St., from Pine to River Sts., that all dead ends be connected as far as possible to enable 2-way feeding of all hydrants, that remote control valve be placed at power house, that 12 in. check valve be placed on low pressure line, to avoid trouble experienced last winter when watermains froze.

Me., York—Town, J. Lucas, chn. Water Comrs., Town Hall, plans extension to waterworks system. Est. about $113,000. **Maturity indefinite.**

Minn., Hallock—City plans furnishing materials and installing water filtration plant, incl. two reservoirs, pumps, chlorinators. E. L. Lium, Grand Forks, N. D., engr.

★ **Mont., Helena**—O. Baarson, engr., City Hall, authorized to apply to P.W.A. for loan and grant of $368,000 to build larger pipe line from Ten Mile settling basin to connect with city's distribution system, and a line down Oro Fino Gulch to Hale Reservoir, for City. $500,000.

N. C., Albemarle—Town filed application with P.W.A. for loan and grant to finance construction of waterworks and sewerage systems. $81,818.

N. C., Enka — A. P. Willis & J. R. Elson, Enka, plans 24 in. galvanized water line in Buncombe Co., running from end of city watermain to Hominy Creek buried under bridge over same creek, along hy. to Southern Railway tracks, to extend quite a distance.

N. C., Gatesville—Town filed application with P.W.A. for funds to finance construction waterworks and sewerage systems. $23,741.

N. C., Grimesland—Town filed application with P.W.A. for loan and grant to finance construction waterworks and sewerage systems. $49,091.

N. C., Hope Mills—Town filed application with P.W.A. for loan and grant to construct waterworks and sewerage systems. $80,000. J. Huckabee, mayor.

N. C., Pikeville—Town filed application with P.W.A. for loan and grant to finance construction waterworks and sewerage systems. $40,000.

N. C., Salemsburg — Town filed application with P.W.A. for loan and grant for waterworks and sewerage systems. $40,000.

N. C., Stantonsburg—See "Sewerage and Waste Disposal."

N. C., Tabor City—Town filed application with P.W.A. for loan and grant to finance construction waterworks and sewerage systems. $103,636.

N. C., Waxhaw—Town filed application with P.W.A. seeking loan and grant for waterworks system. $38,181.

N. C., Wilson—Town filed application with P.W.A. loan and grant to finance construction waterworks and sewerage systems.

N. C., Winterville—Town filed application with P.W.A. for loan and grant to finance construction waterworks and sewerage systems. $60,500.

Okla., Perry—City made preliminary plans impounding reservoir for water supply. $200,000.

Ont., Exeter—Public Utilities Comn., Reeve Pryde, chn., plans 250,000 imperial gal. reservoir and small pipe line to pump water from springs just purchased.

Ont., Kirkland Lake—Teck Twp. Council, J. W. McBain, clk., plans addition to waterworks pumping station at Gull Lake. $60,000. G. Brown & T. McIntyre, 28 Prospect Ave., engrs.

BIDS ASKED

★ **Ark., Little Rock**—June 16, by H. C. Graham, city clk., constructing 32.4 mi. 39- to 43-in. pipe line, incl. accessories, structures, tunnel sections from a point northwest of Paron to connections with present water purification plant. Total est. $3,500,000. P.W.A. project. Burns & McDonnell, City Hall, engrs.; adv. E. N.-R., June 4. Noted May 18, C. D.—May 21, E. N.-R.

N. J., Point Pleasant—Boro taking bids furnishing material and labor completion Schedule D, comprising 22,000 lin.ft. 4- to 12-in. watermains and appurtenances. P.W.A. project. J. D. Humphries, Hayes Bldg., consult. engr.

N. C., Hemp—June 9, by W. P. Saunders, mayor and Town Comrs., water supply and sewage treatment works, 200,000 gal. steel water tank and tower on concrete found. $192,500. Bids May 6 rejected. L. V. Edwards, Hemp, engr. Noted May 14, C. D.

O., Ashley—June 9, by Clerk Bd. City Trustees, furnishing, installing 100,000 gal. elevated steel tank on Ashley Waterworks System. Contr. 3-P.W.A. $10,500. Jennings & Lawrence Co., 12 North 3rd St., Columbus, engrs.

O., Ashley—June 9, by Clerk Bd. City Trustees, furnishing, installing watermains and pump for Ashley Waterworks System. Contr. 2-P.W.A. $39,304. Jennings & Lawrence Co., 12 North 3rd St., Columbus, engrs.

Ont., Stratford—June 11, by A. B. Manson, genl. mgr. P. Utility Com., Diesel generator unit, Canadian or British manufacture, 300 hp. for waterworks standby purposes.

CONTRACTS AWARDED

Calif., Manhattan Beach—City Clerk, drilling one 16 in. well from 300 to 500 ft. deep, to Roscoe Moss Co., 4360 Worth St., Los Angeles, $1,664. Bids May 21, awarded May 21.

Calif., San Francisco—Dpt. P. Wks., City Hall, installing Mission Dist. extension to A.W.S.S. for fire protection, to E. J. Treacy, Call Bldg., $50,659. Est. $60,000. **P.W.A.** Bids May 6, awarded May 21. Noted May 11, C. D.

Colo., Colorado Springs—City, E. Mosley, mgr., constructing South Catamount Creek Dam 1,200 ft. long, 90 ft. high, 815 m.g. capacity, earth dam with steel face, on north slope of Pike's Peak, to Ed. H. Honnen Constr. Co., 208 West Las Animas St., $386,789; steel facing, to American Bridge Co., 208 West La Salle St., Chicago, Ill., $117,925. **P.W.A.** Bids May 15, awarded May 20. Noted Apr. 29, C. D.—May 7, E. N.-R.

Ky., Hodgenville—Municipality, waterworks system, incl. 100 ft. concrete dam across Nolynn Creek, storage reservoir, filter plant, etc., to G. M. Eady Co., 340 Byrne St., Louisville, $40,985. **P.W.A.** Noted Oct. 18, C. D.—Oct. 24, E. N.-R.

Mass., Boston—Procurement Division, U. S. Treas. Dpt., 275 tons 12 in. c.i. pipe for W.P.A. watermain project, to Warren Fdry. & Pipe Corp., Phillipsburg, N. J.

Mass., Milton—City, 200 tons c.i. pipe for watermains, to Warren Fdry. & Pipe Corp., Phillipsburg, N. J.

Mass., Salisbury—Village, 250 tons c.i. pipe for watermain project, to Warren Fdry. & Pipe Corp., Phillipsburg, N. J.

★ **Ill., Cicero** — City, general contract constructing waterworks system, to Leininger Constr. Co., 30 North LaSalle St., Chicago, $923,523. **P.W.A.** Bids Apr. 29. Noted Apr. 21, C. D.—Apr. 23, E. N.-R.

Kan., Hazelton — City, constructing waterworks and distribution system, to C. L. Burt, 515 West Second St., Hutchinson, $35,850. **P.W.A.** Bids Nov. 12. Noted Nov. 7, C. D.

N. H., Concord—City, P. R. Sanders, supt. Water Dpt., City Hall, laying 4,500 lin.ft. c.i. pipe watermain at Silver Hill, day labor. Furnishing 100 tons 6 and 8 in. c.i. pipe, to U. S. Cast Iron Pipe Co., Burlington, N. J. Noted May 6, C. D.—May 14, E. N.-R.

N. J., Andover — Boro, constructing waterworks project, installing townsite pipe waterlines, to J. Della Penna, Haskell, $12,673; purchasing, delivering transite pipe and fittings, to Johns Manville Sales Corp., Madison Ave. and 41st St., New York, $15,160. **P.W.A.** Noted May 27, C. D.—May 7, E. N.-R.

N. J., Caldwell—Boro, constructing 6 in. c.i. watermains in Bloomfield Ave., Cedar and Bowers Rds., Knowlwood, Warren and Jackson Places, Hatfield and Crane Sts., and 8 in. c.i. watermain in Westfield Ave., day labor. J. S. Provost, engr., in charge. $28,506. **W.P.A.** Pipe purchased by Procurement Division, W.P.A., 1060 Broad St., Newark.

N. Y., Brocton—Village, water supply system, to E. L. Harrington, 158 Berkshire Ave., Buffalo, $68,728. **P.W.A.** Bids May 11. Noted May 18, C. D.—May 7, E. N.-R.

O., Bellevue—City, waterworks improvements, Contr. A, elevated tank, to Pittsburgh Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $26,303. **P.W.A.** Noted Jan. 31, C. D.—Feb. 6, E. N.-R.

O., East Canton — City, waterworks, Contr. 3-B, distribution system, to A. & M. Diano, Canton, $33,577; Contr. 3-C, elevated tank, to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $10,736. **P.W.A.** Noted Mar. 25, C. D.—Apr. 2, E. N.-R.

O., Oak Hill—City, waterworks, Contr. 5, additional well, to Ohio Drilling Co., 113 Third St. N.W., Massillon, $1,026. **P.W.A.**

Tenn., Linden—City, Contr. A, water distribution system, well, pump, etc., to Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, Ia., $27,185; steel tank on tower, to R. D. Cole Mfg. Co., Newman, Ga., $7,360. Est. $34,545. **P.W.A.** Bids Nov. 22. Noted Nov. 19, C. D.

Tex., Tyler—City, c/o A. H. Balch, mgr., furnishing, installing, new chlorinator in waterworks plant, to Wallace & Tiernan Co., Central Bank Bldg., Dallas and c/o A. H. Balch, city mgr., approximately $86,300. **P.W.A.** Bids Apr. 29. Noted Apr. 28, C. D.

Va., Rocky Mount—City, constructing water filtration plant, to Boyd & Goforth, Inc., Charlotte, N. C. Noted May 13, C. D.—May 21, E. N.-R.

Wis., Elkhart Lake—Village, pumping machinery, to Aurora Pump Co., Aurora, Ill., $2,974; constructing reservoir and pump station, to H. B. Janke, Fredonia, $11,375. **P.W.A.** Bids May 23. Noted May 12, C. D.—May 14, E. N.-R.

Ont., Leamington—Piggott Constr. Co., general contractors, Piggott Bldg., Hamilton, installing 1,800 ft. 30 in. steel intake, intake well and pump house foundation, to Wm. Birmingham & Son, 184 Wellington St., Kingston, for H. J. Heinz Co. Est. $12,000. Noted May 19, C. D.—May 21, E. N.-R. under "Industrial Buildings."

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Arvin—Arvin County Sanitation Dist. surveys to be made disposal plant, consisting of Imhoff tank and 2 mi. 15 in. concrete sewer main. To exceed $25,000.

Conn., Essex — Town indefinitely postponed plans for sewage disposal plant and sewerage system, due to a suitable site for sewage plant. $100,000. N. L. Wright, chn. Sewer Com.

Ill., Alton—City plans sewerage system extensions. C. L. Pitchford, city engr.

Mich., Detroit—Dpt. P. Wks. returned bids to have been opened May 22, unopened to contractors for Sects. 11 and 12, Detroit River Interceptor Sewer, part of $22,000,000 P.W.A. sewage disposal plant. Both sections will be readvertised at later date. J. S. Stringham, city engr. Noted May 1, C. D.—May 7, E. N.-R.

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Federal Government projects symbol †

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†*Federal Government*

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Sewerage, etc. (Continued)

N. Y., East Syracuse—City plans constructing sewers to empty into Ley Creek disposal plant, and have formed Sewer District Park Hill Section and will apply for W.P.A. or P.W.A. grant for portion of cost. $258,902.

N. Y., Falconer — Villages of Lakewood, Celoron, Fluvanna and Mayville, and Chautauqua Lake Assn., D. W. Buckmaster, pres., Jamestown, plans sanitary sewerage system and treatment plant. To exceed $23,000. $11,600 allotted by W.P.A. for survey of Chautauqua Lake, incl. preparation of plans and estimate of cost. S. E. Fitch, 484 North Work St., co. engr.

N. C., Albemarle—See "Waterworks."

N. C., Gatesville—See "Waterworks."

N. C., Grimesland—See "Waterworks."

N. C., Jonesboro—Town filed application with P.W.A. seeking loan and grant to construct sanitary sewers. $50,909. W. L. Thomas, mayor.

N. C., Pikeville—See "Waterworks."

N. C., Salemsburg—See "Waterworks."

N. C., Spencer—Town seeking P.W.A. loan and grant to construct sanitary sewers. $80,084. T. P. Fowler, mayor.

N. C., Spindale—Town, S. E. Elmore, mayor, plans collection sewers and pumping plant. $23,000. Harwood-Beebe, Spartanburg, S. C., engrs.

N. C., Stantonsburg—Town filed application with P.W.A. for loan of $22,000 and grant of $18,000 for flood sewerage system and waterworks improvements. Est. $40,000.

N. C., Tabor City—See "Waterworks."

N. C., Wilson—See "Waterworks."

N. C., Winterville—See "Waterworks."

N. C., Youngsville—Town filed application with P.W.A. for loan and grant to finance construction of sanitary sewerage system. $52,727.

O., Columbus—City plans three superstructures and one administration building, Columbus Sewage Treatment Works, Contr. 6, Building 1, control gallery, one story 27x576 ft., stone masonry structure, Building 2, 1¼ story, 60x150 ft. stone preliminary treatment tank building, Building 3, one story, 15x20 ft. stone, clorination building, Building 4, 1 story, 40x80 ft. stone administration building. $220,000. P.W.A. project.

Pa., Kittanning—Borough plans completed and will probably seek W.P.A. financing for 1,950 ft. 24 in., 1,200 ft. 12 in. c.i. pipe and 800 ft. 24 in. terra cotta sewers in Water St. $36,311. W. G. Aye, Market St., engr. P.W.A. funds rescinded. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

Pa., Patton—Borough plans sewage disposal plant on site just acquired in Elder Twp. To exceed $23,000. **Maturity indefinite.** Engineer not appointed.

★ **Wash., Seattle**—City, P.W.A. funds asked constructing Units 9 and 10, Henderson St. trunk Sewer Project, incl. sewer north on East Marginal Way, to West Oregon St., and sewage treatment plant on West Oregon St. $500,000. T. R. Beeman, County-City Bldg., engr. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

Wis., Menomie—City rejected bids May 13, constructing sewage treatment plant. P.W.A. project. S. P. Hall, Eau Claire, engr. Noted May 25, C. D.—May 28, E. N.-R.

Que., Verdun—Municipality making plans new incinerator plant. Available $35,000-$40,000. H. Hadley, city engr.

BIDS ASKED

Ind., LaPorte—June 12, by Bd. P. Wks., constructing sewage disposal plant. $250,000. P.W.A. project. Noted Apr. 28, C. D.—Apr. 30, E. N.-R.

Kan., Axtell—See "Contracts Awarded."

La., Donaldsonville—June 13, by Municipality, waste disposal plant, incinerator. To exceed $23,000. F. B. Medford, Donaldsonville, engr. Noted May 20, 1935, C. D.—May 23, 1935, E. N.-R.

Mass., Boston—June 11, by Commonwealth of Massachusetts, Metropolitan Dist. Comn., Sewerage Division, W. E. Whittaker, secy., 20 Somerset St., 7,830 ft. sewer Sect. 115, Part "A," of P.W.A. Project 1098, North Metropolitan Relief Sewer, Winchester, Woburn and Stoneham. To exceed $175,000. F. Smith, ch. engr. sewer division. Noted Apr. 20, C. D.—Apr. 23, E. N.-R.

Minn., Adrian—See "Streets and Roads."

N. Y., Elmira—City taking bids replacing Roe Creek Sewer in Erie R.R. yards with 36 in. Armco paved invert pipe or rein.-con. pipe with rein.-con. foundation underneath. Former bids rejected. C. C. Hunter, city mgr. Noted Apr. 10, C. D.—Apr. 16, E. N.-R.

N. C., Hemp—See "Waterworks."

LOW BIDDERS

★ **N. Y., New York**—Dpt. Sanitation, T. W. Hammond, comr., 125 Worth St., New York, May 25, electrical equipment, Contr. EMQ, at Wards Island Sewage Treatment Works, Sects. 3 and 4, from Clinton Heywood, 38-06 28th St., Long Island City, $1,349,096. Noted Apr. 28, C. D.—Apr. 30, E. N.-R.

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CONTRACTS AWARDED

Calif., San Francisco—Dpt. P. Wks., Marina North Point Discharge Sewer, involving [illegible] constructing 30 in. internal diam. discharge sewer to Marina Sewage Pumping Plant, North Marina Blvd., etc., to Sibley Grading & Tank Co., 165 Landers St., using concrete protected pipe, $122,247. **P.W.A.** Bids May 6, awarded May 21. Noted May 11, C. D.

†**Calif., San Francisco** — Con. Q.M. Fort Mason, repairing sewers and drainage system at Letterman General Hospital, to A. G. [illegible], 1 DeHaro St., $4,885.

Conn., Middletown—City, P. Wks. Dpt., constructing sewage disposal plant, Contr. B-2, to Suburban Eng. Co., 15 West 38th St., New York, $178,318; sludge incinerator, Contr. B-3, to Sanitation Eng. Co., 247 Park Ave., New York, $23,000. Subject to **P.W.A.** approval. Noted May 20, C. D.—Apr. 30, E. N.-R.

★ **Ill., Chicago — Sanitary Sewer** Dist., 910 South Michigan Ave., constructing West Towns Outlet Sewer, Contr. 1, to Heriln Mid-Continent Co., 20 North Wacker Dr., $1,210,965. **P.W.A.** Bids May 14.

Kan., Axtell—City, new sewerage system, **W.P.A.** labor. $42,000. Black & Veatch, 4706 Bway., Kansas City, Mo., engrs.

Mass., Pittsfield—City, A. B. Fordham, comr., Contr. 2, constructing building and electric power transmission lines and control equipment for sewage treatment plant now under construction, to E. J. Cramer, 73 North St., $22,032. **P.W.A.** Bids Apr. 28—awarded May 21.

Mich., Howell—City, constructing municipal sewage disposal plant, to C. D. Kelly Co., 872 West Milwaukee Ave., $43,641. **P.W.A.** Noted Dec. 23, C. D.

Minn., Renville—City, constructing sanitary sewerage system, about 19,000 lin.ft. 8 in., 14,070 ft. 10 in. and 1,560 ft. 12 in. pipe, 64 manholes, to Barnett & Record Co., 1700 Flour Exchange, Minneapolis, $25,865. **P.W.A.** Bids May 15. Noted Apr. 24, C. D.—Apr. 30, E. N.-R.

Mo., Webster Groves—Webster Groves Sanitary Sewer Dist., constructing rein.-con. trunk line sanitary sewers along Deer Creek Valley, extending from end of Sect. A at Lacledes Station Rd. to Lake Line Crossing west of Bompart Ave., to Stiers Bros. Constr. Co., 2944 Magazine St., St. Louis, $171,281. **P.W.A.** Bids May 22. Noted May 29, C. D.—May 14, E. N.-R.

N. Y., Stella—Town of Dickinson, constructing sewerage system, Contr. 3, to George & Evans, 301 Union Springs Trust Bldg., Warren, O. Est. $60,000. **P.W.A.** Noted May 25, C. D.—May 7, E. N.-R.

N. Y., Syracuse—City, replacing old Midland sewer and repaving Midland Ave., relief forces. To exceed $23,000. **W.P.A.** G. L. Noble, Post Office Bldg., Syracuse, procurement officer W.P.A., will purchase materials.

Pa., Clarion—See "Streets and Roads."

Tex., Houston—City, c/o O. F. Holcombe, mayor, constructing Little White Oak Bayou trunk sanitary line sewer line, from Wrightwood Pumping Station to Link Rd., to Russ Mitchell, 2701 Texas Ave., Houston, $144,708 base bid. Est. $150,000. **P.W.A.** Bids May 13. Noted May 21, C. D.

W. Va., Morgantown—Municipality, constructing 80 ton incinerator, to Decarie Incinerator Co., 155 East 44th St., New York, $53,200. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

Wis., Appleton—City, constructing Contrs. GA and GB, canal crossings and miscellaneous sewer connections, to Hoffman Constr. Co., Appleton, $54,837***Contr. GC, pumping station and appurtenances, to C. R. Meyer & Sons, Oshkosh, $19,378. **P.W.A.** Bids May 14. Noted May 19, C. D.—May 21, E. N.-R.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Calif., Los Angeles—City plans 56x380 ft. rein.-con. bridge over Los Angeles River, Victory Blvd. $250,000. Old timber bridge to be abandoned. Application will be made to P.W.A. for 45% of cost, balance to come from gasoline tax funds. K. W. Stewart, City Hall, bridge engr.

Iowa — State Hy. Comn., Ames, soon takes bids constructing 144x24 ft. continuous I-beam overhead bridge, 1 rein.-con. box culvert and 1 rein.-con. pipe culvert, incl. 340 cu.yd. Class 1 excav. over Wabash Ry., on secondary road at Solomon, Mills Co.; 40x20 ft. I-beam bridge, 350 cu.yd. Class 1, 170 cu.yd. Class 2, and 200 cu.yd. channel excav. on secondary road Sect. 23, Butler Twp., Scott Co.; 68x20 ft. I-beam bridge, concrete floor and wood creosoted substructure and 308x20 ft. continuous I-beam bridge, 85 cu.yd. Class 1 and 295 cu.yd. Class 2 excav. on secondary road north of Dumont, Sect. 21, Pittsford Twp., Butler Co.; 6 corrugated metal pipe, 9 rein.-con. concrete pipe and 1 rein.-con. concrete box culverts, on secondary road, Tippecanoe Twp., Henry Co., 213 cu.yd. Class 1 excav.; 2 corrugated metal pipe, 2 rein.-con. concrete pipe and 3 rein.-con. box culverts on secondary road from Kossuth Northeast, Des Moines Co., 241 cu.yd. Class 1 excav.; 190x24 ft. continuous I-beam overhead bridge on secondary road, M. & St. L. R.R. crossing north of Eldora, Hardin Co., 210 cu.yd. Class 1 excav.; 3 corrugated metal pipe, 2

†*Federal Government*

Bridges, etc. (Continued)

reinforced concrete pipe, 5 laminated wood box and 4 reinforced concrete box culverts and relaying 2 old corrugated metal pipe culverts on secondary road east of Underwood, Pottawattamie Co., 1,272 cu.yd. Class 1 excav. F. R. White, state hy. engr.

Iowa—State Hy. Comn., Ames, making plans constructing 202x24 ft. continuous I-beam overhead bridge and 1 rein.-con. box culvert extension on U. S. Rd. 34, west of Rome, at C. B. & Q. R.R. crossing, Sect. 6, Tippecanoe Twp., Henry Co. F. R. White, ch. engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing 2 rein.-con. box and 1 rein.-con. pipe culverts on Primary Rd. 14, north of Greene, Butler Co., incl. 95 cu.yd. Class 1 excav.; two I-beam bridges, concrete floor and wood substructures on secondary road northeast of Walnut, Pottawattamie Co., 50 cu.yd. Class 1 excav. F. R. White, ch. engr.

Ia., Anamosa—Jones Co., G. F. Specht, aud., plans constructing bridges and culverts $50,700; grading 115.25 mi. roads $124,950; graveling 162.25 mi. roads $100,280. E. G. Hennigsen, co. engr.

Ia., Bloomfield—Davis Co., C. R. Allen, aud., plans bridges and culverts $27,921; grading 9.75 mi. road $28,960; graveling 27.85 mi. road $22,362. M. H. Bryant, co. engr.

Ia., Iowa City—Johnston Co., E. Sulek, aud., plans bridges and culverts $36,838; grading 74.34 mi. roads $118,727; graveling 29.49 mi. roads $56,065. R. J. Justen, co. engr.

Ia., Manchester—Delaware Co., R. Welterlin, aud., plans bridges and culverts $59,441; grading 138.6 mi. roads $69,730; graveling 138.1 mi. $72,114. H. S. Klaus, co. engr.

Ia., Muscatine—Muscatine Co., K. Coder, aud., plans bridges and culverts $62,835; grading 67 mi. road $146,985; graveling 67 mi. road $80,828. F. P. G. Halbfas, co. engr.

Ia., Sioux City—Woodbury Co., W. H. Thompson, aud., plans bridges and culverts $94,547; grading 19.93 mi. road $69,149; graveling 2.5 mi. road $3,568. J. C. McLean, co. engr.

Mass., Huntington—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, plans rein.-con., structural steel grade crossing, Main St. $350,000. G. H. Delano, Dpt. P. Wks., Boston, ch. engr.

Mass., Springfield—City, J. W. Cunliffe, chn. Bd. P. Wks., City Hall, plans rein.-con., structural steel bridge, Water Shops Pond, part of Cross Town Blvd. project. H. G. White, 496 Bridge St., engr.

Missouri—State Hy. Comn., Jefferson City, plans constructing one 45 ft. and two 25 ft. rein.-con. deck girder spans, Route 40 TR, St. Louis-Wentzville Rd., St. Louis Co.; six 28 ft. concrete and creosoted pile spans over Osage River, Roscoe-Monegow Spring Rd., St. Clair Co. To exceed $46,000. T. H. Cutler, ch. engr.

Mo., Kansas City—City soon takes bids constructing rein.-con. underpass at 14th Street traffic-way and Washington St. $50,000. R. W. Waddell, City Hall, engr.

Neb., Nebraska City—City plans constructing viaduct over C. B. & Q. & M. P. R.R. tracks. $112,000.

N. J., Belleville—Essex Co. Park Comn., 115 Clifton Ave., Newark, plans constructing concrete slab bridge for 4 tracks for underpass of Orange Branch Erie R.R. in Branch Brook Park Extension. $60,000. H. J. Phillips, 115 Clifton Ave., Newark, engr.

N. Y., Yonkers—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, making plans constructing Palmer Ave. Bridge, steel, concrete. Property purchased.

Pa., Wilkes-Barre—City, H. Weiss, clk., making plans 2 hy. bridges over Solomon's Creek. To exceed $23,000. **Maturity late in summer.** Probably will be W.P.A. project. W. P. Johns, city engr.

Texas—State Hy. Comn., H. Hines, chn., Austin, soon takes bids P. and S. F. R.R. underpass and approaches, Hy. 117, W.P.G.M., Panhandle, Carson Co.; G. C. and S. F. R.R. overpass and approaches, Oaklawn St., W.P.G.M. 859-A, Dallas, Dallas Co., $43,500; C. R. I. and G. and D. C. R.R. underpass and approaches, Buckannon St., W.P.G.M. 951-A, Amarillo, Potter Co. New P.W.A. projects.

Texas and **Oklahoma**—States of Texas and Oklahoma, J. L. Dickson, dist. engr., San Antonio, plans rein.-con. steel vehicular bridge over Red River, between Bonham, Tex. and Durant, Okla. Est. $240,000. Texas Engineers will advertise for bids as soon as plans are completed by Oklahoma Dpt.

Tex., San Antonio—Bexar Co., International, Great Northern R.R. and State B. and B. Dpt., c/o J. L. Dickson, div. engr., Travis Bldg., takes bids in early part of June for construction of rein.-con. underpass under I. G. N. R.R. tracks on San Pedro Ave. $135,000.

Que., St. Malachie—Municipality made plans constructing rein.-con. bridge on concrete abutments and approach to bridge over Henderson River, 8th Range. $30,000. Dpt. P. Wks. & Labour, Quebec City, engr.

BIDS ASKED

Ill., Cairo—June 23, by Cairo Bridge Comn., Bd. Trade Bldg., constructing substructure (piers and abutments) for highway bridge to be constructed over Ohio River P.W.A. Mod-

†*Federal Government*

jeski, Masters & Chase, Keystone Bldg., Harrisburg, Pa., engrs. Noted Aug. 20, 1934, C. D. ——Aug. 23, 1934, E. N.-R.

Ill., Chicago—June 12, by O. E. Hewitt, city comr., City Hall, removing superstructure and substructure of existing bascule bridge and constructing substructure of double leaf trunnion bascule bridge over west fork of South Branch of Chicago River at South Ashland Ave. P.W.A. project.

Ill., Hennepin—June 12, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, constructing rein.-con. substructure for bridge over Illinois River on Route 89, Sect. 119-B, Bureau and Putnam Counties.

Iowa—June 9, by State Hy. Comn., Ames, constructing one 130x24 ft. continuous I-beam overhead on secondary road west of Atkins, C. M. St. P. & P. Ry. crossing, WPGS-633, Benton Co., incl. 190 cu.yd. Class 1 excav.; 37 ft. through plate girder underpass on Primary Rd. 11, Fayette, WPGM-59, Fayette Co., 135 cu.yd. Class 1 excav.; 122x24 ft. continuous I-beam bridge on secondary road north of Hampton, C. R. I. & P. Ry. crossing, WPGS-626, Franklin Co., incl. 225 cu.yd. Class 1 excav.; one 130x24 ft. continuous I-beam overhead bridge on secondary road at C. G. W. Ry. crossing east of Rowan, Franklin and Wright Counties, 210 cu.yd. Class 1 excav.; 14 rein.-con. pipe and 3 rein.-con. box culverts and 210x24 ft. continuous I-beam bridge on Primary Rd. 46, between Jamaica and Bagley, WPGH-619-A, Guthrie Co., 309 cu.yd. Class 1 excav.; 122x24 ft. continuous I-beam bridge in Jewell, WPGM-597-H, Hamilton Co., 310 cu.yd. Class 1 excav.; 130x24 ft. secondary road south of Eldora, Hardin Co., 190 cu.yd. Class 1 excav.; 130x24 ft. continuous I-beam overhead bridge on secondary road south, WPGS-636-A, Henry Co., 110 cu.yd. Class 1 excav.; 2 corrugated metal pipe culverts, 8 rein.-con. pipe culverts and 4 rein.-con. box culverts and extensions, secondary road from Oakland Mills north to U. S. Rd. 34, Henry Co., 222 cu.yd. Class 1 excav.; 30 ft. undergrade crossing, 1 rein.-con. box culvert, one 40x24 ft. I-beam bridge on U. S. Rd. 169, C. R. I. & P. Ry. crossing southwest of Livermore, Humboldt Co., 268 cu.yd. Class 1, 130 cu.yd. Class 2 and 890 cu.yd. channel excav.; 172x24 ft. continuous I-beam overhead bridge on secondary road, Sect. 15, WPGS-629, Johnson Co., 330 cu.yd. Class 1 excav.; 2 rein.-con. pipe culverts on U. S. Rd. 169, south of Winterset, Madison Co., 340 cu.yd. Class 1 excav.; 90x20 ft. pony truss bridge on secondary road west of Coin, Page Co., 45 cu.yd. Class 1 and 90 cu.yd. channel excav.; 6x6 ft. culvert to existing culvert or constructing rein.-con. pipe culvert on U. S. Rd. 59, east of Carson, Pottawattamie Co., 325 cu.yd. Class 1 excav.; 9 rein.-con. pipe and 6 rein.-con. box culverts on secondary road out of Walnut, northeast, Pottawattamie Co. F. R. White, Ames, ch. engr.

Ia., Manchester—June 9, by Delaware Co., R. Welterlen, aud., constructing 140 ft. truss and rebuilding 150 ft. I-beam bridge. H. S. Klaus, co. engr.

Louisiana—June 10, by State Hy. Comn., Baton Rouge, constructing 1,449 ft. I-beam span on rein.-con. bents overpass over Louisville & Nashville R.R., west of Lee on New Orleans Slidell Hy., Project 1552, WPGM 318, Orleans Parish.

Minnesota—June 12, by State Hy. Dpt., St. Paul, constructing Bridge 5444, concrete deck girder five span overhead, State Project 10-3-62-1, WPGH 114-A, Sherburne Co.; Bridge 5165, four beam span overhead, S.P. 1515-30, WPGM 341-B, Sibley Co.; Bridge 5345, five span beam overhead, S.P. 23-23-30, WPGH 257-B, Pine Co., incl. 9,500 cu.yd. borrow excav.; Bridge 5310, four span beam overhead, S.P. 100-130-22, WPGMS 540-C, Hennepin Co.; Bridge 5478, five span concrete deck girder overhead, S.P. 210-2-30-5, WPGH 386-J, Crow Wing Co.

★**Nebraska**—June 25, by State Dpt. Roads & Irrigation, Lincoln, constructing viaducts, subways and bridges in various cities. $1,088,000. A. C. Tilley, state hy. engr.

New York — June 15, by Lake Champlain Bridge Comn., M. Y. Ferris, chn., at office Acting State Director P.W.A., Federal Bldg., Rutland, Vt., constructing steel superstructure for bridge over Lake Champlain from Rouses Point, N. Y., to Alburg, Vt., incl. twelve 122 ft. fixed spans, structural steel semi-thru trusses and structural steel thru center bearing truss draw span, 320 ft. long overall; complete with steel concrete deck, draw operating machinery, gates, toll house, lighting and appurtenances. Fay, Stafford & Thorndike, 44 School St., Boston, Mass., engrs. Noted May 5, C. D.—May 7, E. N.-R., under "Contracts Awarded."

New York—June 16, by Dpt. P. Wks., Albany, 88 ft. girder bridge at Penn. R.R. on Geneva-Canandaigua Rd., W.P.G.H. R.C. 3782, Ontario Co., $63,909; 70 ft. girder bridge over New York Ontario and Western R.R. on Chester Vails Gate Rd., S.H. 154, W.P.G.H. 849-B, W.P.G.H. R.C. 3783, Orange Co., $126,734; 145 ft. girder bridge over Delaware & Hudson R.R. on Duanesburg-Quaker St. Rd., S.H. 5551, W.P.G.H. 655-B, Schenectady Co., $88,115. Total $278,758.

N. Y., Delhi—June 10, by Bd. Supervs. Delaware Co., Delhi, constructing concrete, steel bridge in Walton and Delhi. To exceed $23,000. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

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Bridges, etc. (Continued)

N. Y., Warwick—June 9, by Dpt. Social Welfare, State Bldg., Albany, constructing steel, concrete bridge over Wayawanda Creek, State Training School. $26,546. T. F. Farrell, state hy. engr.

Ohio—June 9, by J. J. Jaster, Jr., dir. Hys., Columbus, reconstructing existing separated crossing with D. Y. & I. R.R. Co. and constructing new rein.-con. slab superstructure on existing stone abutments, grading, drainage structures, brick paving 0.022 mi. D. T. & I. overhead bridge on Mountain Ave., Springfield City, Clark Co., $9,971; constructing Bridge Ho-31-36, concrete slab, over branch Buck Run, and Bridge Ho-31-41 concrete slab, over Clear Fork, incl. grading, draining, roadside improvement, brick paving 1.353 mi. part Sect. B, part Sect. M, Logan-Lancaster Rd., State Hy. 360, State Route 31, Goodhope Twp., Hocking Co., $124,283; constructing Bridge OT-163-60, concrete with steel beams over Toussaint River, on Sect. D, Oak Harbor-Genoa Western Rd. and grading, drainage, cold mixed paving, cold laid tar concrete surfacing 0.099 mi. State Hy. 439, State Route 163, Harris and Benton Twps., Ottawa Co., $20,090.

Ohio—June 9, by J. J. Jaster, Jr., dir. State Hy. Dpt., Columbus, constructing grade crossing elimination project with B. & O. R.R., incl. grading, drainage structures, concrete paving, roadside improvement 0.079 mi. part Sect. A, Carthage Hamilton Rd., State Hy. 43, State Route 4, WPGH 539D, Proposal 1, $124,786; grading, drainage structures, roadside improvement, concrete paving 0.079 mi. same road, Proposal 2, $10,951, both Butler Co.; constructing grade separation, with Penn. R.R. and C. & O. R.R., incl. three railroad structures, grading, draining, roadside improvement 0.318 mi. Olentangy Blvd., city of Columbus, city of Grandview Heights, WPGM 854A, Franklin Co. $287,584.

Pennsylvania—See "Streets and Roads."

Wisconsin—See "Streets and Roads."

Ont., Farran's Point—June 8, by W. O. Sheets, clk., reconstructing Shaver Bridge between Lots 12 and 13, Concession 2 of Twp. of Osnabruck. $25,000.

CONTRACTS AWARDED

Alabama—State Hy. Dpt., Montgomery, fills, temporary bridge and adjustments on Southern R.R. and Birmingham Electric tracks at East Thomas, Jefferson Co., to MacDougald Constr. Co., Hemphill Ave., N.W., Atlanta, Ga., **$51,210.** Bids May 7. Noted May 14, C. D.

Alabama—State Hy. Comn., Montgomery, concrete overhead and approaches 0.566 mi. Old Montgomery-Birmingham Rd., WPGS 317, Montgomery Co., to R. T. Smith, Tallapoosa, Ga., **$60,706.** Bids Nov. 20.

Alabama—See "Streets and Roads."

Arizona—State Hy. Dpt., Phoenix, removing existing concrete bridge and constructing new concrete, steel bridge over White Creek Bridge and removal of temporary wooden detour bridge Cochise Co., to J. A. Casson, P. O. Box 2293, **$11,949.** Est. $107,000. (**Correction**—Name of contractor.) Noted May 6, C. D.—May 14, E. N.-R.

†**Arizona and California**—Bureau Reclamation, Denver, Colo., furnishing structural steel for railroad bridge over canal, Sta. 1029, near Yuma, Ariz.; to Virginia Bridge Co., Roanoke, Va., **$40,087;** constructing abutments and erecting steel, to D. H. Ryan, 1615 Fern St., San Diego, Calif., **$155,447.** Bids Apr. 16. Noted Mar. 26, C.D.—Apr. 2, E.N.-R.

Ark., Ft. Smith—Kansas City Southern Ry., A. N. Reece, ch. engr., Kansas City, Mo., trestle approach to bridge over Poteau River damaged by fire was rebuilt with company forces. $33,000 to $35,000. (**Correction**—cost.) Noted Apr. 23, C.D.—Apr. 30, E.N.-R.

Connecticut—See "Streets and Roads."

★**Illinois**—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, bridges in Montgomery Co., to M. C. Robinson, Girard, **$5,748**•••Johnson and Pope Counties, to Mautz & Oren, Inc., Effingham, **$28,160**•••subway in LaSalle Co., to Illinois Valley Constr. Co., Ottawa, **$26,596**••• substructure for bridge in Cook Co., to Allied Bridge & Constr. Co., 201 North Wells St., Chicago, **$101,861**•••superstructure for same bridge, to Oscar Daniels Co., 135 South LaSalle St., Chicago, **$17,178**•••substructure for viaduct in Vermilion Co., to Pickus Eng. & Constr. Co., 38 South Dearborn St., Chicago, **$49,272**••• superstructure for same viaduct, to Vierling Steel Wks., 313 West 23rd St., Chicago, **$22,753**•••floor and sidewalk for viaduct, Vermilion Co., to R. McCalman, Danville, **$14,288** •••furnishing structural steel for same bridge, to Bethlehem Steel Co., 40 North Michigan Ave., Chicago, **$29,204**•••constructing viaduct in Madison Co., to Parham Constr. Co., East St. Louis, **$36,420**•••2 bridges and earthwork approaches in Edgar Co., to Orville Arnold, Casey, **$38,212**•••bridge in Champaign Co., to General Paving Co., Champaign, **$31,541**•••substructure and superstructure for bridge in Clinton Co., to Stupp Bros. Bridge & Iron Co., East St. Louis, **$21,986** and **$21,986** respectively•••floor and rail for same bridge and substructure, erecting structural steel for same bridge, in St. Clair Co., to H. H. Hall Co., East St. Louis, **$24,5**[illegible] and **$63,277** respectively•••substructure and floor and rail for viaduct in Henry Co., to A. Olson Constr. Co., Waterloo, Ia., **$35,252** and **$19,391** respectively•••stairway, lighting system in La-Salle Co., to M. Hayes & Sons, 209 South LaSalle St., Chicago, **$17,869**•••subway superstructure Cook Co., to Mississippi Valley Structural Steel Co., Melrose Park, **$36,424.** Grand total $671,955. Bids Jan. 31, Apr. 10, Apr. 24, and Apr. 18. Noted Mar. 18, Apr. 2 and Apr. 24, C.D.

Indiana—State Hy. Comn., Indianapolis, constructing 252 ft. bridge in Putnam Co., to Calumet Paving Co., Gary, **$116,744** est. $139,747; 185 ft. rein.-con. girder bridge in Lake Co., to H. G. Christman Constr. Co., 308 South Notre Dame Ave., South Bend, **$98,3**[illegible] est. $101,582. Bids Apr. 28. Noted May 4, C. D. Apr. 23, E.N.-R.

Indiana—State Hy. Comn., Indianapolis, 2 bridges over Big Creek, near Lynnville, Warrick Co., to M. & P. Corp., Rockport, $28,165 est. $28,525•••3 bridges over Watt, Kifer and Graper Branches, near Lynnville, Warrick Co., and 4 bridges over Pigeon Creek and Barn Branch Rural District, Gibson and Warrick Counties, to R. P. Oblinger, Huntingburg, **$14,768** and **$59,237** respectively, est. $17,214 and $61,212 respectively•••constructing 90 ft. steel beam bridge on creosoted wood piling and repairing 127 ft. steel truss bridge over Salamonie River and Rock Creek, near Montpelier and Rural District, Blackford and Wells Counties, to H. L. Maddocks, Newark, O., **$13,325** est. $13,636•••bridge over Spring Creek, Rural District, Whitley Co., to Tri-Lake Constr. Co., Columbia City, **$13,129** est. $13,641. Grand total $128,623. Bids Mar. 10, Apr. 7 and Apr. 28. Noted Apr. 13, C. D.—Mar. 26, E. N.-R.

Ia., Primghar—O'Brien Co., 25 box culverts and extensions, to Forgie & Groth, Sioux Center, **$10,277;** structural steel for two I-beam bridges, to Des Moines Steel Co., 421 Southwest 4th St., Des Moines. Noted May 11, C. D.—May 14, E. N.-R.

Kansas—State Hy. Comn., at office of County Clerk, Cottonwood Falls, Bridge 3.5A, 35x22x 129 ft., underfill barrel arch, Project 13-2-WPGH 256 A, and Bridge 3.5B, 96 ft. through plate girder span, on same road, to Cook & Ransom, Ottawa, **$11,407** and **$24,615** respectively•••Bridge 10.3, four 50 ft. rein.-con. deck girder and one 90 ft. truss spans, Project 15-19B-ERP. 7, Clay Co., to D. G. Hansen, Logan, **$40,820.** Grand total $76,842. Bids May 20. Noted May 4, C.D.—May 7, E.N.-R., under "Streets and Roads."

Kentucky—State Hy. Comn., Frankfort, two 40 ft. rein.-con deck girder bridge over Valley Creek, Elizabethtown, Hardin Co., to Municipal Paving & Constr. Co., 316 South 1st St., Nashville, **$17,880;** two 25 ft. rein.-con. deck girder bridge on Stanford-Mt. Vernon Rd., Lincoln Co., to F. T. Justice & Co., Lexington, **$8,562.** Bids May 8. Noted May 14, C. D. under "Bridges and Grade Crossings"—Apr. 30, E. N.-R., under "Streets and Roads."

Maryland—State Roads Comn., Baltimore, single 191 ft. steel arch span bridge, substructure, etc., over tracks of B. and O. R.R., at Rockville, Contr. M-117-1-321, Montgomery Co., to P. Reddington & Sons, 2 East Lexington, Baltimore, **$80,682.** Bids May 5. Noted May 11, C. D., under "Bridges and Grade Crossings," and Apr. 30, E. N.-R., under "Streets and Roads."

Minnesota—State Hy. Dpt., St. Paul (**S. P. means State Project**), constructing Bridge 5445, concrete deck girder and nine beam span overhead, S.P. 14-7-41-3, WPGM 444C, Lincoln Co., to McCree & Co., 918 New York Bldg., St. Paul, **$74,630**•••Bridge 5447, three span beam overhead, S.P. 23-210-22-1A, WPGMS 556A, Kandiyohi Co., and Bridge 5479, five beam span overhead, S.P. 65-5-43-1, Isanti Co., to McCree & Co., 918 New York Bldg., St. Paul, and Widell Co., Mankato, **$26,939** and **$42,528** respectively•••Bridge 5501, double track beam span underpass, incl. 0.571 mi. grading, S.P. 71-4-52-3A, Redwood Co., to Western Asphalt Paving Corp., 2100 East 4th St., Sioux City, Ia., **$65,550.** Grand total $209,647. Bids May 15. Rejected bids May 15, constructing Bridge 5684, beam span, Project 82-04, Washington Co. Noted May 5, C. D.—May 14, E. N.-R.

Missouri—State Hy. Dpt., Jefferson City, three 31 ft. I-beam bridge over east fork of Hickory Creek, Fairfax-Maryville Rd., W.P.S.O. 510-C, Atchison Co., and two 23 ft. and one 31 ft. I-beam spans over Hickory Creek, same road, to O. W. Knutson, 3527 Bway., Kansas City••• two 10-ft. rein.-con. slab spans over North Fork, three 25 ft. rein.-con. deck girder spans over Red Bank Creek, and three 35 ft. rein.-con. deck girder spans over Clifty Creek, on Vanzant Rd. East, Douglas Co., to J. A. Kerr, Ozark•••four 27 ft. and one 49 ft. I-beam spans over Little River Drainage Ditch 251; bridges over Drainage Ditch 4, Dist. 19, over Drainage Ditch 45, Dist. 20, on Route E-Lilbourn Rd., New Madrid Co., one 35 ft. and one 49 ft. I-beam span bridge and one 140 ft. steel truss spans over Aux Vases River, Route 32 to Coffman Route S.B., Ste. Genevieve Co., three 130 ft. steel truss span bridge and six 49 ft. I-beam span bridge over Salt River Overflow, on Stark-Louisiana Rd., Pike Co., to C. H. Atkinson Paving Co., Chillicothe•••five 45 ft. concrete deck girder span bridge over Shoal Creek, Bary Co.,

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†*Federal Government*

Bridges, etc. (Continued)

to Neyo Constr. Co., Billings***four 40 ft. rein.-con. deck girder bridge over Mike Creek, McDonald Co., to L. L. Sharp, Springfield***three 25 ft. and three 37 ft. I-beam spans over Fourche Adu Chos Creek, Bloomsdale-Lawrence-ton Rd., Ste. Genevieve Co., to L. Penzel, Jackson*** two 90 ft. and 105 ft. continuous plate girder spans over Weldon Fork of Grand River, Trundy Co., to Bushman Constr. Co., St. Joseph***five 29 ft. I-beam spans over Little Auxvasse Creek, Callaway Co., to Lee Van Horne, Jefferson City, and Vaughn Constr. Co., Kirksville***five 31 ft. I-beam spans over Salt Pond Creek, Route A-Sweet Springs, Saline Co., to A. W. Mosley, North Kansas City***culverts on Beaufort-Spring Bluff Rd., Franklin Co., to H. C. Grunewald, St. Louis. Noted May 15, C.D.

Mo., St. Charles—Wabash Railway Co., E. L. Cruzan, ch. engr., c/o N. B. Pitcairn and F. C. Nicodemus, Jr., receivers, and Wabash St. Charles Bridge Co., Railway Exch. Bldg., St. Louis, ballast materials for use on approaches to railroad bridge across Missouri River between St. Charles and St. Louis County, to Rock Hill Stone & Gravel Co., 1233 North Rock Hill Rd., Webster Groves, **$16,612. P.W.A.** Bids May 6. Noted Apr. 28, C.D.—Apr. 30, E. N.-R.

Nebraska†—State Dpt. Roads & Irrigation, Lincoln, to Central Bridge & Constr. Co., Wahoo, armored crossings in Cedar Co. **$1,413**; in Clay Co. **$2,023**; in Boone Co. **$4,602**; in Otoe Co. **$648**; in Fillmore Co. **$850**; in Richardson Co. **$740**; in Holt Co. **$2,888***to Weber & Haring, Kearney, bridge in Knox Co., **$22,-415**. Grand total $35,669. Bids May 21. Noted May 13, C.D., under "Streets and Roads."

N. Y., Brooklyn—Marine Parkway Authority, Arsenal Bldg., Central Park, New York, driving test piles for Marine Parkway across Rockaway Inlet from Marine Park, Brooklyn Boro., to Jacob Riis Park, Queens Boro., to Merritt Chapman & Scott, 17 Battery Pl., New York, $5,428. Bids Apr. 24. Noted Apr. 27, C. D.

N. Y., Hunter—Bd. Supervs. Greene Co., Court House, Catskill, constructing Slater Bridge, incl. approaches and sidewalks, to Good Roads Mchy. Co., 444 Bway., New York. Noted Apr. 14, C.D.—Apr. 16, E.N.-R.

North Carolina—State Hy. and P. Wks. Comn., Raleigh, underpass Southern R.R., Statesville, and concrete approaches 0.64 mi. Project 421, Iredell Co., to F. A. Triplett, Chester, S. C., **$83,-581**; overpass at Cooks Crossing, Project 6151, Cabarrus and Rowan Counties, to E. W. Grannis, Fayetteville, **$30,819.** Bids May 7. State Hy. & P. Wks. Comn., Raleigh, rejected bids May 7, structures, overhead crossing 0.34 mi. Project 4784 Wake Co. Noted May 18, C.D. under "Streets and Roads" and "Bridges and Grade Crossings."

Oregon—See "Streets and Roads."

Pennsylvania—At office W. Van Dyke, secy. Hys., Harrisburg, fabrication and erection of a deck plate girder truss underpass, rein.-con. paving, rein.-con. box with junction box, bituminous on crushed stone surfacing 0.38 mi. Route 161, Sect. 6, West Mahanoy Twp., Gilbertson and Frackville Boroughs, Schuylkill Co., to Bates & Rogers Constr. Co., 11 West Washington St., Chicago, Ill., **$302,728.** Bids May 1. Noted May 18, C.D. under "Bridges and Grade Crossings and Apr. 23, E.N.-R. under "Streets and Roads."

Pennsylvania—See "Streets and Roads."

South Carolina—See "Streets and Roads."

South Dakota—State Hy. Comn., Pierre, constructing 224 ft. bridge and widening 64 ft. bridge WPH 6B and C, Moody Co., to E. A. Kramme Co., Centerville, **$37,744***65 ft. bridge, WPSO 406, Charles Mix Co., to Willis Bonesteel, Wagner, **$5,676***146 ft. bridge and three 10x8 ft. box culverts, Aurora Co., to Graves Bros. Constr. Co., Melvin, Ia., **$15,282.** Grand total $58,702. Bids May 19. Noted May 11, C.D., under "Streets and Roads."

Tennessee—See "Streets and Roads."

Texas—G. Gilchrist, state hy. engr., Austin, constructing Southern Pacific R.R. underpass and approaches on Hy. 33, W.P.G.M., 784-C, El Paso Co., tentatively awarded to F. Hall, Waco, **$84,755.** Bids May 20. New **P.W.A.** Noted May 28, C.D.

Vermont—Missiquoi Bay Bridge Comn., E. T. Bradley, chn., Swanton, approach embankments on Vermont side of bridge over Lake Champlain, to P. Caputo Constr. Co., 1655 Commonwealth Ave., Brighton, Mass., **$373,000. P.W.A.** Bids Apr. 16, awarded May 18. Noted Apr. 23, C.D. —Apr. 9, E.N.-R.

Vermont—State Hy. Dpt., Montpelier, 0.2 mi. structural steel bridge with concrete abutments, gravel approaches, etc., over North Branch River, on Montpelier-Elmore Rd., Worcester, to Ryan & Densmore, Claremont, N. H., **$22,167.** Noted May 15, C.D.—May 26, E.N.-R.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, 50 ft. span T-beam bridge with gravel approaches on Route 30-A, West Enosburg Village, Enosburg, to B. A. Barton Constr. Co., Inc., Main St., Vergennes, **$13,757.** Bids Apr. 24, awarded May 25. Noted Apr. 30, C.D.

†*Federal Government*

STREETS AND ROADS

BIDS ASKED

†Calif., Crescent City—P. Wks. Officer, Mare Island, rejected bids May 13, repairing roadway leading from Crescent City to station at Point St. George, Naval Direction Finder Station. Noted May 25, C.D.—Apr. 30, E.N.-R.

†Calif., Point St. George—June 3, by Yards & Docks, Navy Dpt., Wash., D. C., repairing roads at Naval Direction Finder Station, Spec. 8187.

Colo., Colorado Springs — See "Contracts Awarded."

Connecticut—June 8, at office of State Roads Comn., J. A. Macdonald, state hy. comr., Hartford, rein.-con. paving 895 ft. South Ave. and South Main St., New Canaan, town aid project; waterbound macadam paving 9,672 ft. Converse Rd., Putnam; 3,510 ft. Warwick Rd., New Fairfield; bituminous macadam paving 10,072 ft. Olivia and 6th Sts. and Hawthorne Ave., Derby; rolled bank run graveling 4,000 ft. Kettletown Rd. and 8,500 ft. Purchase Brook Rd., Southbury; 13,922 ft. Tim Clark and George Connor Rds., Simsbury; 5,975 ft. Lawton Rd. and 1,500 ft. Gracey Rd., in Canton; loose gravel surfacing 13,833 ft. Putnam Lake and Ball Pond Rds., New Fairfield; 540 ft. rein.-con. pipe drainage, East Haven, state aid project; removing retaining walls and widening 2,900 ft. Berlin Turnpike Rd., U. S. Route 5, Newington. To exceed $25,000.

Ill., Centerville Station — See "Contracts Awarded."

Ill., Dolton—June 9, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, curbing, guttering, sidewalks, drainage, concrete paving 0.2197 mi. Sect. 2-CS, in Dolton. G. H. Baker, engr. co. roads and city streets.

Indiana—June 16, by State Hy. Comn., Indianapolis, rein.con. and rock asphalt paving 1.945 mi. State Rd. 20, Gray, Lake Co. M. R. Keefe, state hy. engr.

Iowa—June 9, by State Hy. Comn., Ames, concrete paving 0.987 mi. U. S. Rd. 71, WPGM-154-H, Carroll Co., incl. 2,233 cu.yd. excav.; 0.271 mi. U. S. Rd. 30, Carroll Co., 1,834 cu.yd. excav.; 0.535 mi. Primary Rd. 17, WPMS 439-B, Emmet Co.; grading 4.3 mi. secondary road from Cascade North, WPSO 672-AB, Dubuque Co., 100,096 cu.yd. excav.; 5.061 mi. relocation Primary Rd. 46, between Bagley and Jamaica, WPGH-619-A, Guthrie Co., 144,460 cu.yd. excav.; 0.246 mi. secondary road, west of Mount Pleasant, at C. B. & Q. Ry., Henry Co., 20,437 cu.yd. excav.; 2.816 mi. secondary road from Oakland Mills to U. S. Road 34, Henry Co., 57,179 cu.yd. excav.; 0.34 mi. U. S. Rd. 169, west of Livermore, WPGH-117-I, Humboldt Co., 39,679 cu.yd. excav.; 3.804 mi. secondary road from Shelby County Line, WPSO-WPMS-697-AB, Pottawattamie Co., 76,566 cu. yd. excav.; 5.23 mi. secondary road south and southwest of McCausland, Scott Co., 102,663 cu.yd. excav.; bituminous surfacing 0.281 mi. Primary Rd. 212, from Iowa County Line North, F.A.P. 58-CF, Benton Co.; 10.711 mi. Primary Rd. 46, from Dedham south and east to Greene Co. line, Carroll Co.; 4.984 mi. Primary Rd. 40, from Carroll Co. to Guthrie Co., Greene Co.; 0.557 mi. Primary Rds. 25 and 46, from Bayard north to Greene Co. line, Guthrie Co.; 14.207 mi. Primary Rd. 191, from Primary Rd. 7, northeast of Portsmouth Rd., Harrison, Pottawattanjie and Shelby Counties; 12.412 mi. Primary Rd. 12, from Marengo, northward to Benton Co. line, Iowa Co.; 6.998 mi. Primary Rd. 96, from Gladbrook, east to U. S. Road 63, Tama Co.; graveling 5.661 mi. relocating Primary Rd. 46, between Balgye and Jamaica, Guthrie Co.; 6.331 mi. Primary Rd. 22, from Primary Rd. 85, east into Keokuk, Keokuk Co.; 3.782 mi. secondary road, southeast of Malvern, WPSO 441-AB, Mills Co.; 3.865 mi. secondary road between Eddyville and Ottumwa; 9.374 mi. secondary road between Eddyville and Ottumwa, both Wappello Co. F. R. White, ch. engr.

Ia., Primghar—June 11, by O'Brien Co., grading 21 mi. local county road system. W. L. Anderson, co. engr.

Kansas—June 16, by State Hy. Comn. at office of County Clerk, Phillipsburg, resurfacing, sand gravel for cover material 94 mi. hys. in Phillips, Roods, Rawlins, Sherman, Thomas, Wallace and Ellis Counties.

Louisiana—June 10, by State Hy. Comn., Baton Rouge, constructing 2.571 mi. roadway approaches to Red River Bridge at Alexandria, Route 1, Project 4915-A, NRS 159, Rapides Parish; clearing right-of-way buildings, watermains, etc., 1.531 mi. Project 3611-C, WPMH 194-A, Jefferson Parish.

Mo., St Louis—June 23, by Bd. P. Service, City Hall, grading, concrete paving Loughborough St., $23,120; Beck Ave., $45,360; alleys in City Blocks 5380 and 5913, $4,980. L. A. Pettus, city engr.

New Hampshire—June 11, by State Hy. Dpt., Concord, 4 in. on 4 in. gravel surfacing 0.568 mi. Farmington Rd., Carroll Co., incl. 811 cu. yd. earth and 89 cu.yd. rock ledge excav., $7,500; 0.812 mi. east side of River Rd., Milan,

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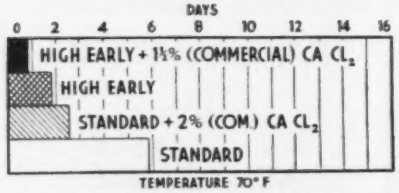

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Streets and Roads (Continued)

Coos Co., 2,501 cu.yd. earth and 100 cu.yd. ledge rock excav., $7,500; 0.52 mi. Goshen Rd., Sunapee, Sullivan Co., 2,652 cu.yd. earth and 50 cu.yd. rock excav., $7,500; 0.85 mi. New Hampton Rd., Sanborton, Belknap Co., 2,215 cu.yd. earth and 237 cu.yd. rock excav., $7,500; 0.37 mi. Laconia Rd.; Meredith, Belknap Co., 703 cu.yd. earth and 540 cu.yd. ledge excav., $7,500; 4 in. on 8 in. gravel surfacing 0.433 mi. East Columbia Rd., Colebrook, Coos Co., 1,294 cu.yd. earth and 215 cu.yd. ledge rock excav., $7,500. C. P. Riford, Concord, engr.

★**New York**—June 16, by Dpt. P. Wks., Albany, concrete paving 3.2 mi. Rhinebeck-Hudson Rd., Part 1, Project 492-E, Dutchess Co., $215,413; 3.37 mi. Tannersville-Haines Falls Rd., SH 1630, Greene Co., $38,925; bituminous mixed paving 2.98 mi. Augusta Rd., Spencer, Sect. SH 438, and Rome Rd., Augusta, Sect. SH 564, Oneida Co., $66,255; 3.33 mi. Phelps-Clifton Springs Rd. SH 608, Phelps-Newark Rd., Part 2, SH 1550, Ontario Co., $114,713; concrete paving 0.47 mi. and constructing 109 ft. girder bridge on Scotia-Wyatts Rd., SH 5030, and Wyatts-Hoffman Rd., SH 5110, Schenectady Co., $171,311; graveling 0.19 mi. and constructing 180 ft. truss bridge in Beeman-Hollow Rd., Steuben Co., $52,961; 4.27 mi. Erwin-Lawrenceville Rd., Part 2, SH 8146, Steuben Co., $116,233; waterproofing, sheet metal, built-up roofing, roof drains and skylight at storage building at Hornell, Steuben Co., $3,000; concrete paving and 75 ft. girder bridge on Sandy Hill-Adamsville Rd., Washington Co., $114,265. Total $893,076.

N. Y., Baldwin—See "Contracts Awarded."

N. Y., Binghamton—See "Contracts Awarded."

N. Y., Camillus—See "Contracts Awarded."

N. Y., Diana—See "Contracts Awarded."

N. Y., Elmira—See "Contracts Awarded."

N. Y., Lockport—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., Rome—See "Contracts Awarded."

N. Y., St. George—June 9, by J. A. Palma, pres. Richmond Boro, Boro Hall, bituminous concrete paving roadway of Bentley St. from Amboy Rd. to Perth Amboy Ferry.

N. Y., Syracuse—See "Contracts Awarded."

N. Y., Utica—See "Contracts Awarded."

North Carolina—State Hy. Comn., Raleigh, rejected bids Apr. 15, bituminous surface treating 12.63 mi., P. 1072, Bertie Co., $50,000. Will readvertise. W. V. Baise, Raleigh, engr. Noted Apr. 23, C. D.

Ohio—June 9, by J. J. Jaster, Jr., dir. State Hy. Dpt., Columbus, grading, drainage structures, traffic bound surface course 1.798 mi. Sect. A, part Sect. B, County Hy. 325, WPSO 922A, Ashtabula Co., $9,813; 1.251 mi. Arnold Rd. Township Hy., WPSO 967A, Auglaize Co., $5,312; surface treating with bituminous macadam surface course, special road mix Type T-13, using aggregate Sect. M-31 or M-3.93, part Sect. B, Canton Navarre Rd., State Hy. 511, U. S. Route 62, Stark Co., $19,475; or bituminous macadam surface course, special road mix, $19,146; roadside improvement 0.453 mi. Dublin Bridge Sect. and part Sect. O, Columbus Marysville Rd., State Routes 31 and 161, State Hy. 48, NRM 517D, Franklin Co., Proposal 2A, $6,066; 0.439 mi. same road, Proposal 3A, $4,224; 1.966 mi. part Sect. A, Akron-Cleveland Rd., State Hy. 16, State Route 8, WPMH 19, Summit Co., $7,408.

Ohio—June 9, by J. J. Jaster, Jr., dir. Hys., Columbus, grading, drainage structures, traffic bound paving 3.653 mi. Upper Fivemile Rd. County Hy. T-55, Sterling, Green and Perry Twps., $15,807; 3.39 mi. Cumberland Rd. County Hy. 38, County Hy. T-1, Sterling and Pike Twps., $13,415, both Brown Co.; 0.606 mi. Twp. Hy. 80-K, Center Twp., Mercer Co., $3,417; 3.338 mi. County Rd. 66, Congress and Canaan Twps., Wayne Co., $25,347; 0.801 mi. Sects. A and B, County Hy. 635, Windsor Twp., $2,920; 1.657 mi. Sect. Z, part Sect. AA, County Hy. 22, Kingsville Twp., both Ashtabula Co., $8,100; 3.22 mi. Sect. J, Broken Sword Rd. County Hy. 28, Holmes, Lykens, Chatfield and Liberty Twps., Crawford Co., $19,212; 3.128 mi. Twp. Hy. 33-T, 35-T and 36-T, Vinton Twp., Vinton Co., $19,996; 0.73 mi. Twp. Hy. N-125 F, Union Twp., Mercer Co., $3,224; 4.504 mi. Williamsport-Blooming Grove Rd., County Hy. 20, Franklin and Congress Twps., Morrow Co., $21,977; 2.45 mi. County Hy. 125, Green Twp., Ashland Co., $19,800; 3.941 mi. part Greenwich-Milan Rd., County Hy. 51, Norwalk Twp., Huron Co., $19,493; 3.253 mi. Panter Ridge Rd., County Hy. 5, Twp. Hy. 27, 29, 30 and 31, Salem Twp., Meigs Co., $23,988; 2.064 mi. Tabor-Stockport Rd., Twp. Hy. 15 and 5, Windsor Twp., Morgan Co., $22,101; 3.526 mi. Buchanan Nipgen Rd., County Hy. 31, Pebble Twp., Pike Co., $13,710; 2.228 mi. part Sect. G, County Hy. 59, Paris Twp., Portage Co., $8,162; 2.942 mi. Brandeberry Rd., County Hy. 33-A, Perry Twp., Wood Co., $12,475; grading, drainage structures, bituminous surface treatment paving 2.907 mi. Plymouth Rd., County Hy. 11, Jasper Twp., Fayette Co., $24,628; grading, drainage structures, stabilized material paving 2.193 mi. Vanderbilt Rd., County Hys. 328 and 323, Washington Twp., Richland Co., $19,888; grading, drainage structures, traffic bound surfacing 2.215 mi. Hull Prairie Rd., Sect. A, County Rd. 97, Sec. B, Cross Creek Rd., County Rd. 216, Middletown Twp., Wood Co., $8,378; grading, drainage structures, [illegible] macadam paving 2.717 mi. Sect. U, [illegible] Rd. 12, Sect. H, Twp. Rd. 7, Warner and [illegible] Henry Co., $21,932; 1.89 mi. Toussaint-South Rd., County Rd. 104, Salem and Carr[illegible] Ottawa Co., $21,745; 1.633 mi. Sect. [illegible] South Rd., County Hy. 339, Yo[illegible] Sandusky Co., $12,708; brick paving [illegible] part Portsmouth Sect., part New Bo[illegible] Ohio River Rd., State Hy. 7, U. S. Ro[illegible] Portsmouth and New Boston Cities, Scioto Co., $107,528; hot mixed resurfacing, [illegible] asphalt surface course, 5.157 mi, part Sect. H, National Rd. U. S. Route 22 and 40, State Hy. 1, Westland, Adams and Cambridge Twps., Guernsey Co., $31,587.

Oregon—State Hy. Comn., Portland, rejected bids May 21, surfacing, oiling 9.3 mi. Liberal-Marquam Sect. Cascade Secondary Hy., Clackamas Co.; 7 mi. Lava Lake Little Butte Sect. McKenzie Hy., Deschutes Co.; 3.5 mi. Tucker Bridge Winans Sect. Hood River Secondary Hy., 8.28 mi. Deadwood Creek-Greenleaf Creek Sect. Siuslaw Hy.; 21.74 mi. Hermiston Echo Junction Sect. Hermiston Secondary Hy. and Lexington Sand Hollow Sect. Lexington Echo Hy., 18.9 mi. Nye Junction Camas Valley Sect. Pendleton-John Day Hy.

†**Pennsylvania**—June 11, by Pub. Rds., 1725 F St. N.W., Wash., D. C., constructing road, Project 4A3-5A4, in Gettysburg Natl. Military Park, at Gettysburg, incl. 510 cu.yd. excav. C. H. Spelman, dist. engr.

Pennsylvania—June 12, at office W. Van Dyke, secy. Hys., Harrisburg, grading, drainage 2 rein.-con. and one I-beam bridge, 12,876 ft., Routes 01063 and 01064, Menallen Twp., Bendersville Boro, Adams Co., involving 575 cu.yd. Class 2 excav.; vitr. brick on plain concrete paving and relaid brick paving 2,056 ft. R-120, Sect. 14, Wilkinsburg Boro, Allegheny Co., 4,065 cu.yd. Class 1 and 249 cu.yd. Class 2 excav.; bituminous on native stone paving 17,930 ft. R-865, Sect. 1, Karthaus and Covington Twps., Clearfield Co., 168 cu.yd. Class 2 excav.; rein.-con. paving, rein.-con. bridge, rein.-con. arch, plate girder underpass bridge, bituminous on modified crushed aggregate paving, etc., 6,848 ft. R-496, Sect. 6, R-25006, Spur E and Twp. Road Connection, Springfield Twp., Erie Co., 28,223 cu.yd. Class 1 and 2,073 cu.yd. Class 2 excav.; bituminous on native stone or crushed aggregate paving, 4 timber deck I-beam bridge 8,288 ft. R-66004, North Hopewell Twp., York Co., 31,406 cu.yd. Class 1, 1,102 cu.yd. Class 2 and 2,013 cu.yd. borrow excav.; fabrication and erection plate girder bridge, through truss bridge and rein.-con. paving 4,850 ft. R-84, Sect. 8, Woodcock and Hayfield Twps., Crawford Co., 16,841 cu.yd. Class 1, 4,283 cu.yd. Class 2 and 17,792 cu.yd. borrow excav.

Pa., Canton—See "Contracts Awarded."

Pa., Clarion—See "Contracts Awarded."

Pa., Coplay—See "Contracts Awarded."

Tex., Beeville—Bee Co., Engineering Branch, c/o A. F. Hoffman, Beeville, soon takes competitive bids building farm-to-market roads in north and south sections of county. Total est. $325,000. $225,000 bonds voted.

Wisconsin—June 9, by State Hy. Comn., and County Hy. Comrs. of Wood and Adams Counties, Wisconsin Rapids, concrete surfacing 0.302 mi. Main St. and Second Ave., Pittsville, S.T.H. 13 and 73, State Project 4684; grading, draining, concrete surfacing 0.198 mi. Letender Ave., Port Edwards, S.T.H. 54, State Project 4688, both Wood Co.; grading, draining, constructing 40 ft. I-beam span structure 3.314 mi. Wisconsin Dells Wisconsin Rapids Rd., S.T.H. 13 and 21, State Project 4758, Adams Co., incl. 51,893 cu.yd. common excav.; constructing one 45 ft. I-beam span bridge, incl. grading, drainage, concrete surface approaches 0.088 mi. Erickson Bridge and approaches, S.T.H. 13, State Project 4765, Wood Co.

CONTRACTS AWARDED

Alabama—State Hy. Comn. Dpt., Montgomery, grading, draining, temporary surfacing and concrete, steel bridge on 2.238 mi. Cullman-Holley Pond Rd., Cullman Co., to J. R. Cothran, 3472 Piedmont Rd. N.E., Atlanta, Ga., and Beckham & Lawler, Perry, Ga., **$70,179.** Bids May 7. Noted May 14, C. D.

California—State Hy. Comn., Sacramento, applying seal coat on 32.9 mi. hy. and applying oil treatment on portions of hy. between Hot Creek and Cedarville Mountain and between southerly boundary and Alturas, Modoc Co., to C. F. Frederickson & Sons, Lower Lake, **$18,960**; grading, asphalt concrete paving 3.5 mi. hy. between Yolo Causeway and M St. subway, Yolo Co., to A. Teichert & Son, 1846 37th St., Sacramento, **$157,486.** Bids May 13. Noted May 22, C. D.

California—State Hy. Comn., Sacramento, crusher run and plant-mixed surfacing 8.8 mi. road between Kuburg and Strawberry, El Dorado Co., to Union Paving Co., Call Bldg., San Francisco, **$145,532.** Bids May 6. Noted May 11, C. D.

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†*Federal Government*

Streets and Roads (Continued)

Calif., Los Angeles—Harbor Dpt., asphaltic concrete pavement, involving 4,000 tons asphaltic concrete base and 4,000 tons asphaltic concrete wearing surface, various roadways, shed floors and wharf decks, to Griffith Co., 502 Los Angeles Railway Bldg., **$26,825.** Bids May 13, awarded May 21. Noted May 20, C. D.

Calif., Oakland—City Port Comn., paving at terminal and roadways leading to same at Outer Harbor Terminal, to Independent Constr. Co., 146th and Clement Sts., **$52,325.** Bids May 4. Noted May 20, C. D.

Calif., Palo Alto — E. L. Beach, city clk., asphaltic concrete paving, curbing, guttering, to A. J. Raisch, Lincoln Ave. and San Salvador St., San Jose, **$27,117. P.W.A.** Bids May 4. Noted May 20, C. D.

Colo., Colorado Springs—City, oil surfacing 170,503 sq.yd. 51 blocks in various parts of city, day labor. **F. O. Ray, city engr.**

Connecticut—State Roads Comn., J. A. Macdonald, state hy. comr., Hartford, waterbound macadam paving 2,145 ft. Mountain Rd., Granby, to E. Natale, 138 Beechwood Rd., Torrington, **$10,650*****box culvert on Route 25 Washington, to T. Zoli, 1 Eno Ave., Torrington, **$8,289*****loose and rolled gravel surfacing 13,901 ft. Ranny Rd., etc., Roxbury, to Hy-Way Constr. Co., 362 River St., Bridgeport, **$28,970*****bridges and culverts Durham-Higganum Rd., Haddam, to Brunalli Constr. Co., 85 Columbia St., New Britain, **$21,211.** Grand total $69,120. Bids May 11. Noted May 8, C. D.—May 7, E. N.-R.

Conn., Hartford—Bd. Contr. & Supply, furnishing sheet asphalt and paving 24,640 sq.yd. city streets, to Edward Bell Co., 173 State St., Hartford, **$30,575.** Est. exceeds $25,000. Bids May 19. Noted May 12, C. D.—May 14, E. N.-R.

★**Illinois**—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, grading 0.08 mi. road in Bureau Co., to Dungey & Cochran Constr. Co., Marion, **$21,258*****17.58 mi. Sects. 25A-WPSO-MS and 26A WPSO-MS in Livingston Co., to Cameron Joyce Co., Keokuk, Ia., **$34,438** and **$25,128** respectively***12.08 mi. Montgomery Co., to Harrison Eng. & Constr. Co., Fairfax Bldg., Kansas City, Mo., **$66,665*****1.55 mi. Johnson and Pope Counties, to Ulan & Gandy, Ullin, **$18,266*****5.95 mi. Ogle Co., to Anderson Bros., Rockford, **$42,910*****0.16 mi. and 3.54 mi. Vermilion Co. and to R. McCalman, Inc., Danville, **$37,800** and **$163,635** respectively***0.15 mi. McHenry Co., to E. M. Melahn Constr. Co., Algonquin, **$21,747*****4.13 mi. Cook and Lake Counties, to Chicago Heights Coal Co., Chicago Heights, **$374,360*****2.5 mi. Cook Co., to T. McQueen, Forest Park, **$245,735*****1.28 mi. Kankakee Co., to R. P. Devine Co., Watseka, **$52,730*****0.24 mi. Cook Co., to H. C. Goelitz Co., Oak Park, **$41,619*****0.28 mi. Rock Island Co., to Central Eng. Co., Davenport, Ia., **$34,371*****0.8 mi. road in LaSalle Co., to H. Zolpher & Sons, Mendota, **$66,492*****2.71 mi. Alexander and Pulaski Counties, to Barnett & McCoy Constr. Co., Carbondale, **$32,238*****5.51 mi. Livingston Co., to Triangle Constr. Co., Kankakee, **$49,027*****paving 6.8 mi. LaSalle Co., to H. Zolpher & Sons, Mendota, **$66,492.** Grand total $1,394,911. Bids Dec. 6, Mar. 3, Apr. 10, Apr. 24, C.D.. Noted Mar. 18, Apr. 2 and 24, C.D.

Ill., Centerville Station — Centerview Twp., constructing and repairing various roads and sidewalks in township, also widening, surfacing auxiliary roads to airports south of East St. Louis, relief labor, $42,000. **W.P.A. J. F. Grahmann, twp. hy. comr.**

Ill., Danville—Dpt. P. Wks., Div. Hys., concrete paving 1.5857 mi. Sect. 27-1-MFT, Vermilion Co., to Danville Constr. Co., Danville, **$39,981.** Bids Apr. 20. Noted Apr. 6, C. D.—Apr. 9, E. N.-R.

Indiana—State Hy. Comn., Indianapolis, bituminous retread surfacing 2.806 mi. roads in Clark Co., to Robinson Gregory & Co., and Hart & Hart, Columbus, **$115,521** est. $120,944; rein.-con. paving 4.611 mi. St. Joseph Co., to Rieth, Riley Constr. Co., Goshen, **$218,337** est. $304,755. Bids Apr. 7. Noted Apr. 13, C. D.—Mar. 19 and 26, E. N.-R.

Iowa—State Hy. Comn., Ames, to Hargrave Constr. Co., Cedar Rapids, bituminous surfacing 19.484 mi. Cass and Montgomery Counties, **$59,649*****to Bituminous Paving Materials Corp., 1432 Wilson Ave., Des Moines, 11.241 mi. Guthrie Co, **$32,748;** 10.571 mi. Allamakee Co. **$64,773*****to Koss Constr. Co., 205 Old Colony Bldg., Des Moines, 12.521 mi. Pottawattamie Co. **$8,481;** 7.842 mi. Dickinson Co. **$24,113*****to Iowa Road Building Co., 1495 Keo Way, Des Moines, 3.199 mi. Adams Co. **$10,039;** 6.681 mi. Adams and Taylor Counties **$20,008;** 4.12 mi. Fremont Co. **$10,679;** 3.367 mi. Fremont Co. **$8,840;** 4.195 mi. Fremont Co. **$9,809;** 7.929 mi. Taylor Co. **$24,339.** Grand total $313,426. Bids May 12. Noted May 22, C.D.

Ia., Cherokee—Cherokee Co., H. M. Montgomery, aud., grading 21 mi. road, to J. W. Scothorn, Cherokee, **$33,836.** Bids May 22. Noted May 13, C. D.

Ia., Elkador — Clayton Co., E. F. Siefert, aud., grading 3.7 mi. road, to J. P. Hurley, Epworth, **$14,759*****stone surfacing 7.58 mi. to Interstate Constr. Co., Cobb, Wis., **$11,363*****4.2 mi. road, to Concrete Materials Co., Waterloo, **$6,105*****19 concrete box culverts, to Eberhard Constr. Co., Guttenburg, **$5,658.** Grand total $37,886. Bids May 22. Noted May 15, C. D.

Ia., LaMars—Plymouth Co., L. A. Ludwig, aud., grading 10.6 mi. road, to Clark Constr. Co., Merrill, **$25,518*****8 concrete box culverts and one I-beam bridge, to R. Noll, Peterson, **$10,438*****culvert pipe, to Barton Warner Co., Sioux City, **$4,013.** Grand total $39,969. Bids May 18. Noted May 13, C. D.

Ia., Tipton—Cedar Co., crushed stone surfacing road, incl. 16,190 cu.yd. Class A crushed stone, to Concrete Materials Co., Waterloo, **$27,037.** Bids May 25, C. D.

Kansas—State Hy. Comn., at office of County Clerk, Cottonwood Falls, earthwork and culverts 0.557 mi. Project 13-2-WPGH 256 A, Chase Co., to List & Clark, Railway Exchange Bldg., Kansas City, Mo., **$26,129.** Bids May 20. Noted May 4, C.D.—May 7, E.N.-R.

Kentucky—State Hy. Comn., Frankfort, grading, draining 5.358 mi. Columbia-Liberty Rd., Casey Co., to Cumberland Constr. Co., Burkesville, **$45,030*****widening surface and constructing culvert 0.265 mi. Lake St., Fulton, Fulton Co., to R. F. Pryor & Co., Mayfield, **$17,895*****roadside improvement using bituminous surfacing Type 2, water macadam base 0.748 mi. Cloverport-Hawesville Rd., Hancock Co., to Ellis, Kelly & Co., Owensboro, **$7,125*****grading, draining 1.004 mi. Smocks Chapel-St. Rose Rd., Washington Co., to Nally & Mudd & Tewmey & Gibson, Springfield, **$10,479*****traffic bound limestone surfacing 2.303 mi. Sullivan-Boxville Rd., Union Co., to Alexander & Hopson, Cadiz, **$9,027*****traffic bound river gravel surfacing same road, to Robert M. Robinson, Owensboro, **$9,573.** Grand total $89,556. Bids May 8. Noted May 14, C. D.—Apr. 30, E. N.-R.

Ky., Louisville—Dpt. P. Wks., City Hall, to Henry Bickel Co., 435 Garden St., constructing Bluegrass Ave. from Rutland Ave. to Southern Parkway, **$35,382*****to George M. Eady Co., 340 Byrne St., Boulevard Napoleon from Overlook Terrace to Trevillian Way, **$17,419*****to Louisville Asphalt Co., 240 East Lee St., Arcade Ave. from Taylor Blvd. to Weyler Ave., **$13,270;** Catalpa St. from Wilson to Gaulbert Aves., **$14,682*****to Andrew-Collings Asphalt Co., 13th and St. Louis Sts., Eastview Ave. from Lakeside to Westlake Aves., **$19,496;** Everett Ave. from Bonnycastle to Speed Aves., **$21,674;** Speed Ave. from Springdale Dr. to Caseliberry Rd., **$27,131.** Grand total $149,054. Bids Apr. 27, C. D. Noted Apr. 23, C. D.

Maryland—State Roads Comn., Baltimore, concrete paving 2.95 mi. National Pike Hy., Contr. W-170-1-636, Washington Co., to Roberts Paving Co., Salisbury, **$131,718.** Bids May 5. Noted May 11, C. D.—Apr. 30, E. N.-R.

Maryland—State Roads Comn., Baltimore, macadam paving 2.05 mi. Contr. CE-116-1-42, Cecil Co., to T. Edgie Russell Co., Frederick, **$54,795;** gravel paving 2.53 mi. along Hermanville Ridge Rd., from end of Contr. CH-117 toward Ridge, Contr. SM-120-182, St. Marys Co., to Jarboe & Haughton, Mechanicsville, **$29,194.** Bids May 12. Noted May 19, C. D.

Md., Bel Air—Comrs. Harford Co., grading, placing pipe and gravel surface course and constructing 24 ft. road from Dwayers Crossing to Magnolia Rd., to Ehrhardt & May, 5723 Harford Rd., Baltimore. Bids May 4. Noted Apr. 29, C. D.

Massachusetts—Commonwealth of Massachusetts, Metropolitan Dist., Water Supply Comn., 20 Somerset St., Boston, gravel mixed in place surface course with refined tar on 1.8 mi. highway in Dana and Petersham, to Carlo Bianchi & Co., Inc., 200 West Central St., Framingham, **$68,040.** Bids May 7, awarded May 22. Noted May 13, C. D.—Apr. 30, E. N.-R.

★**Minnesota**—State Hy. Dpt., St. Paul (**S. P. means State Project**), grading 3.2 mi. S.P. 4-4-55-3A and B, WPSS 546D and WPMS 546E, and 4.3 mi. S.P. 95-95-23-1A and B, WPSS 549A, to O'Malley & Tryborn, 811 Phoenix Bldg., Minneapolis, **$26,939** and **$35,283** respectively***0.9 mi. S.P. 75-6-60-1A and B and S.P. 14-7-41-3, WPMH 270C, WPGM 270B, 444-C, to Western Asphalt Paving Corp., 2100 East 4th St., Sioux City, Ia., **$38,108*****3.4 mi. S.P. 371-19-22-1 and 2, WPGH 373C and WPGH 373D, to Zontelli Bros., Crosby, **$22,472*****grading, gravel surfacing 3.1 mi. S.P. 1-35-28-2, Fed. Aid Project 519, to A. Johnson Constr. Co., 1411 Foshay Tower, Minneapolis, **$145,695*****6.6 mi. S.P. 61-1-29-1, F.A.P. 282B, to Whitmas & Barg, Bovey, **$139,915*****13.4 mi. S.P. 75-6-40-1, F.A.P. 349A, to J. Rath Constr. Co., 657 Lexington Ave., St. Paul, **$95,107.** Grand total $503,519. Bids May 15. Noted May 5, C. D.—May 14, E. N.-R.

★**Missouri**—State Hy. Dpt., Jefferson City, to O. Knutson, 3527 Broadway, Kansas City, crushed stone or gravel surfacing 4.134 mi. Clay Co., **$7,202;** 0.323 mi. Atchison Co., **$16,752*****to Royce Zink, Appleton City, 4.545 mi. Route 71-Merwin Rd., Sect. 2A, **$6,319;** 4.683 mi. Sect. 1A, same road, **$6,164,** both Bates Co.***to Lee Van Horne, Jefferson City and Vaughn Constr. Co., Kirksville, 2.188 mi. Tibbetts-Mohaskne Rd., Sect. WPSO 546B, **$19,-**

†*Federal Government*

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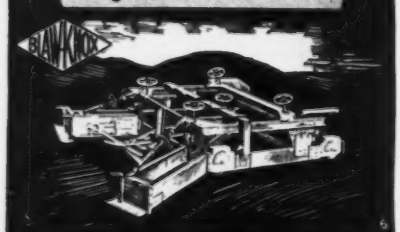

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Literature on any of the above BLAW-KNOX Products will be sent upon application.

Streets and Roads (Continued)

841; 3.214 mi. same road, Route SD, **$6,604**; 0.331 mi. WPSS 546A, **$239**, all foregoing Callaway Co.***to Nevada Constr. Co., Nevada, 3.48 mi. Sect. 2, Bates City-Chapel Hill Rd., **$14,542**; 3.977 mi. same road, Sect. 1, **$12,180** ***to Neyer Constr. Co., Billings, graveling 4.422 mi. Roaring River Park to Selegman Rd., Sect. 4A, **$6,004**; 4.934 mi. same road, Sect. 3B, **$6,087**, both Barry Co.; 1.745 mi. Niangua Bridge-Camdenton Rd., FAP 607E, **$31,425**; 3.566 mi. FAP 607D, same road, **$65,719**, both Camden Co.***to Bushman Constr. Co., St. Joseph, 0.17 mi Grundy Co., **$38,669*****to A. W. Mosley, North Kansas City, 0.541 mi, Saline Co., **$22,694*****to L. L. Sharp, Springfield, 0.382 mi. McDonald Co., **$16,963*****to J. L. Pohl, Nevada, 4.735 mi, Wright Co., **$3,280** ***to L. Penzel, Jackson, 0.132 mi. Ste. Genevieve Co., **$15,147*****to E. F. Delaney, Holcomb, 2.893 mi. New Madrid Co., **$36,507*****to Kissick Constr. Co., Hickman Mills, 3.522 mi. Howard Co., **$5,503*****to J. A. Kerr, Ozark, 3.936 mi. Vangant East Rd., WPSO 742B, **$23,-351**; 4.017 mi. WPSO 742A, same road, **$32,-133**, both Douglas Co.***to Cook & Cone, Ottawa, Kan., 4.481 mi. Route 38-Pierce City Rd., **$1,437**; 4.508 mi. Sect. 1A, same road, **$2,584*****to H. H. Hanankratt & Sons, Kansas City, 3.159 mi. Route M-Johnson County Rd., **$5,456**; 3.733 mi. Sect. 3A, same road, **$6,360**, both Pettis Co.***to L. Gray, St. Louis, levee along Missouri River, St. Louis Co., **$11,201** ***to Atkinson Paving Co., Chillicothe, 0.663 mi. Ste. Genevieve Co., **$32,346**; 0.615 mi. Pike Co., **$78,266**; grading, concrete paving 3.772 mi. FAP 64A, **$112,937**; 2.902 mi. same road, Sect. FAP 64B, **$87,911**; 0.135 mi. Intersection Routes 19 and 16, **$15,410**, all foregoing Ralls Co.***to H. L. Perkins, Nevada, chat surfacing 3.977 mi. Dade Co., **$5,790**; 3.286 mi. Sect. 2A, same road, **$4,426*****to Ray & Son, Louisiana, 0.946 mi. FAP 487A2, **$1,271**; 4.933 mi. same road, FAP 487B1, **$6,811**; 1.531 mi. same road, FAP 477C, **$2,072**; 3.568 mi. Stark-Louisiana Rd., Sect. 4A, **$2,338**, all foregoing Pike Co. Grand total $769,941. Bids May 7. Noted May 15. C. D.

Nebraska — State Dpt. Roads & Irrigation, Lincoln, to Central Bridge & Constr. Co., Wahoo, and to Kissick Constr. Co., Hickman Mills, Mo., bituminous sand surfacing 10.4 mi. road in Holt and Antelope Counties, **$62,336**; bituminous mat surfacing 8 mi. Cherry Co., **$32,056**; 11.1 mi. Cherry Co., **$45,417**; 4.5 mi. Cherry Co., **$22,114*****to Abel Constr. Co., Lincoln, and to J. N. Einung, Wayne, 5.4 mi. Cedar Co., **$32,068**; 8.3 mi. Cedar Co., **$51,405** ***to J. E. Tift, Grand Island, 1.7 mi. Knox Co., **$21,555*****to E. L. Marrs, Arnold, 4.5 mi. Cherry Co., **$14,751*****to Steele Bros., Dorchester, maintenance graveling 7.8 mi. Lancaster and Gage Counties, **$2,413*****to Overland Sand & Gravel Co., Osceola, 12.3 mi. Cass and Otoe Co., **$2,694*****to Orshek & Christensen, Cedar Rapids, 33.2 mi. Cass Co., **$4,821**; 18 mi. Cass and Otoe Counties, **$3,819*****to H. A. Risk Pipe & Constr. Co., Nebraska City, 5.5 mi. Johnson Co., **$3,005**; 18.2 mi. Otoe and Johnson Counties, **$5,574**; 9.4 mi. Richardson Co., **$3,-390*****to Abel Constr. Co., Lincoln, 10 mi. Richardson Co., **$4,088*****to Allen Davison Co. Beatrice, 9.3 mi. Pawnee Co., **$3,261*****to Meridian Constr. Co., York, 2 mi. Filmore Co., **$484**; 3 mi. Polk Co., **$539**; 34.1 mi. Holt Co., **$7,320**; 18.4 mi. Holt Co., **$4,097**; 15.6 mi. Loup and Garfield Counties, **$1,726**; 12.6 mi. Loup and Rock Counties, **$1,186**; 10.7 mi. Garfield Co., **$1,886*****to Platte Valley Constr. Co., Grand Island, 10.4 mi. Scotts Bluff and Banner Counties, **$1,691*****to M. M. Leggett, Benedict, 2.2 mi. Box Butte Co., **$865**; 13.4 mi. Dawes Co., **$4,300*****to Lippincott & Nichols, Hastings and Geneva, 3.7 mi. Custer Co., **$2,143** ***to Inland Constr. Co., Omaha, 24.8 mi. Boyd and Holt Counties, **$4,430**; 20.4 mi. Boyd Co., **$4,240*****to W. Krotter & Son, Stuart, 23.6 mi. Boyd Co., **$5,946**; 19.1 mi. Holt and Wheeler Counties, **$4,510**; 4.3 mi. Rock Co., **$1,093**. Grand total $381,323. Bids May 21. Noted May 13. C. D.

Neb., Lincoln—City, to Cochrane Constr. Co., 821 1st Natl. Bank Bldg., paving Dist. 19, $3,-024; Dist. 17, $1,730; Dist. 22, $2,500; Dist. 27, $2,714; Dist. 850, $23,778*****to Abel Constr. Co., 900 North 16th St., Dist. 742, $34,749. Grand total $68,505. Bids Apr. 15. Noted May 5. C. D.—Apr. 9, E. N.-R.

New Jersey—E. D. Sterner, comr. State Hy. Dpt., Trenton, constructing Route S-6, Sect. 1, Union Blvd., Passaic Co., to Union Building & Contg. Co., 631 Main Ave., Passaic, **$72,984**. Noted May 20. C. D.—May 28, E. N.-R.

New Jersey—See "Unclassified."

★ **New Mexico**—State Hy. Dpt., Santa Fe, grading, minor and drainage structures, 2 course surfacing, miscellaneous constructing 4.705 mi. and grading, drainage structures, base course surfacing 6.623 mi. both Valencia Co., to R. L. Hanes, Albuquerque, **$11,227** and **$124,-684** respectively, est. $99,465 and $174,115 respectively***7.5 mi. Lincoln Co., to Armstrong & Armstrong, Roswell, **$224,919** est. $219,356***grading, drainage, irrigation, structures, planting, seeding, landscape work, Valencia Co., to F. O. McDaniels, Santa Fe, **$8,067** est. $8,402***grading, drainage structures, 1 course surfacing 9.81 mi. Taos Co., to Deaking & Gustafson, Taos, **$74,521** est. $75,301. Grand total $503,418. Noted May 19. C. D.—May 21, E. N.-R.

N. Y., Baldwin—Village, resurfacing and guttering 3.6 mi. Ridge Rd., relief labor, $[illegible]15 or more. **W.P.A.** J. E. Williams, Federal Bldg., Elmira, procurement officer W.P.A., will purchase materials.

N. Y., Binghamton—Broome Co., constructing, guttering, paving Beartown Rd., $8,000; Fall Brook Rd., $3,590; and Endicott Hoopes Rd., $20,000, own forces. Grand total $31,590.

N. Y., Brooklyn — R. V. Ingersoll, Bros., Brooklyn Boro, Boro Hall, relocating street surface railroad on Jay and Smith Sts., to H. Reynolds Corp., 50 Park Pl., New York, $5[illegible]10. **P.W.A.** Bids Apr. 8. Noted Apr. 9, C.D.

N. Y., Camillus—Village, Village Hall, guttering and paving various streets, relief labor. To exceed $23,000. **W.P.A.** G. L. Noble, procurement officer W.P.A., Old Post Office Bldg., Syracuse, will purchase materials.

N. Y., Diana—Village, constructing 3 mi. Russel Turnpike from county line southwesterly, own forces. $40,000. **W.P.A.** D. Mahoney, Hotel St., Utica, procurement officer W.P.A., will purchase materials.

N. Y., Elmira—City, C. C. Hunter, mgr., repairing and resurfacing city streets, relief labor. To exceed $23,000. **W.P.A.** funds allotted. J. E. Williamson, Federal Bldg., Elmira, procurement officer W.P.A., will purchase materials.

N. Y., Lockport — **Niagara Co.**, bituminous paving 4 county highways and repairing, improving highways, own forces, under supervision of R. M. Rumsey, co. engr. $186,000.

N. Y., New York—S. Levy, pres. Manhattan Boro, Municipal Bldg., converting Old Park Ave. Tunnel from 34th to 41st Sts. into vehicular roadway, removing car tracks, temporary ramp, etc., relief labor. $177,321. **W.P.A.**

N. Y., Rome—Bd. Supervs. Oneida Co., Court House, constructing and repairing Dorn and Jackson Hill Rds., in Boonville; Florence Hill Rd., in Camden and Florence; and Hamlen Rd., Florence; Stop 7 Rd., Kirkland and Westmoreland; Sherman Dr. Rd., New Hartford; Davies Rd., Paris; Dustius Bridge Rd., Remsen; and Fish Creek Landing Rd. and Steuben-Bethel Rd., Rome, relief labor. $47,000. **W.P.A.** D. Mahoney, Hotel St., Utica, procurement officer W.P.A., will purchase materials.

N. Y., Syracuse—See "Sewerage and Waste Disposal."

N. Y., Syracuse—City, City Hall, R. D. Marvin, mayor, paving Burnet Park Dr., Grant and Onondaga Creek Blvds., Onondaga Park, Burdick, Gilbert, Belden and Comstock Aves., Chester, Huntley, Fountain, Park, Martin, Herkimer, Beattie, Layette, Geddes, North Clinton, McBride, Hickory, East Kennedy, Ash, Josephine, Peters and Fabius Sts., own forces, $361,642. **W.P.A.** G. L. Noble, Post Office Bldg., Syracuse, procurement officer W.P.A., will purchase materials.

N. Y., Utica—City, City Hall, repairing and repaving Bush Rd., Court, Dakin, Hopper, Scott, Albany, Grant, Grove, Henry, Jay, McVean, Noyes, Parkway, Rutger, Seymour, Warren, Oriskany, William, Culvert, 3rd and Welsh Sts., relief labor. $100,000. J. B. Shaw, city engr.

★ **North Carolina** — State Hy. and P. Wks. Comn., Raleigh **(P. means Project)**, to F. J. McGuire, Washington, grading 12.69 mi. P. 104, Dare Co., **$90,600*****to Blythe Bros., Charlotte, concrete paving, structures 14.37 mi. P. 1263, **$84,347**; concrete paving 0.66 mi. P. 1279, **$9,035**, both in Edgecombe Co.***to Wm. Muirhead Constr. Co., Durham, asphalt on concrete surfacing, structures 0.04 mi. P. 4110, Durham Co., **$47,622*****to J. P. McGuire Constr. Co., Durham, concrete paving, structures 0.96 mi. P. 4111, Durham Co., **$43,001**; sand clay surfacing 0.34 mi. approaches to overhead crossing P. 4784, Wake Co., **$8,264*****to Lavender Bros., Earl, grading, gravel surfacing, bituminous surface treating 4.96 mi. P. 4404, Johnston and Harnett Counties, **$44,815*****to E. W. Grannis, Fayetteville, structures on same road, **$4,635*****to Ballenger Paving Co., Greenville, S. C., grading, concrete paving 10.75 mi. P. 6151, Cabarrus and Rowan Counties, **$312,162** ***to Brown Paving Co., Lexington, grading, concrete paving 2.81 mi. P. 6901, Stanly Co., **$59,153*****to T. M. Strider, Cotton States Bldg., Nashville, Tenn., grading, traffic bound macadam surfacing 9.23 mi. P. 9600, Macon Co., **$118,880*****to Hobbs-Peabody Constr. Co., structures on same road, **$9,403*****to Kiker & Yount, Reidsville, bituminous surface treating 7.06 mi. P. 5523, Montgomery and Richmond Counties, **$26,984**; 11.79 mi. P. 5955, Rockingham and Caswell Counties, **$37,850**; 10.87 mi. P. 6065, Anson and Richmond Counties, **$41,-361**. Grand total $938,112. Bids May 7. Noted May 18, C. D.

N. C., Greenville—M. K. Blount, mayor and comrs., asphaltic or concrete base surfacing 13,-500 sq.yd. streets, to J. G. Clark & Co., Greenville, **$31,590**. **P.W.A.** Bids Apr. 20. Noted May 1. C. D.

O., Cleveland—Great Lakes Exposition Co., 1912 Terminal Tower, sheet paving, asphalt paving 80,000 sq.yd. exposition grounds, East 9th St. and Lake Erie, to Cuyahoga Asphalt & Paving Co., 9501 Woodland Ave. Est. $75,000.

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†*Federal Government*

Streets and Roads (Continued)

Oklahoma—State Hy. Dpt., Oklahoma City, grading, drainage, 4.2 mi. road in Coal Co., to S. O. Maxey, Durant, **$19,176** est. $20,127 ***3.33 mi. LeFlore Co. and 2.02 mi. Major Co., to T. C. Ottinger, Hinton, **$34,298** and **$8,541** respectively est $34,601 and $9,052 respectively. Grand total $62,555. Bids May 19. Received no bids May 19 improving roads in Pittsburg, Lincoln, Haskill and Kay Counties. Noted May 14, C. D.

Oregon—State Hy. Comn., Portland, grading, macadam surfacing 0.83 mi. Bonneville Eagle Creek Sect. Columbia River Hy., to Orino, Birkemeier & Saremal, Cascade Locks, **$112,890** ***constructing trestle bridge over Olalla Creek, Corvallis-Newport Hy., to W. G. Schmidt, Portland, **$5,280*****constructing frame office building, Roseburg, to P. H. Kelly & A. F. Austin, Roseburg, **$4,555*****constructing Roosevelt Ferryboat at Coos Bay, to Coos Bay Dredging Co., Marshfield, **$339*****oiling, resurfacing Cottage Farm Aumsville Sect. Silver Creek Falls and North Santiam Secondary Hy., to Saxton, Looney & J. S. Risley, Portland, **$42,018*** 9.7 mi. Rocky Point School South Falls Sect. Silver Creek Falls Secondary Hy., to R. C. Dale & Warren Bros., Aberdeen, Wash., **$59,618*** planing, resurfacing pavement, three sections State Hy., Multnomah Co., to Warren Bros., Northwest, **$92,723.** Grand total $317,423. Bids May 21. Noted May 11, C. D.—May 14, E. N.-R.

Oregon—State Hy. Comn., Portland, surfacing, oiling Criterion Sect. Dalles California Hy., Deschutes Co., to Joplin & Eldon, Portland, **$136,200*****5.3 mi. Wocus March Link River Sect., Klamath Lake Secondary Hy., Klamath Co., to Dunn & Baker, Klamath Falls, **$39,824** ***planing, resurfacing pavement 60 mi. Azalea Wolf Creek Summit Sect., Pacific Hy., Douglas Co., to J. C. Compton, McMinnville, **$59,515** ***surfacing 6 mi. three Mile Creek Eight Mile Creek Sect., the Dalles Dufur Rd., Wasco Co., to Hart Constr. Co., La Grande, **$15,343** ***grading, surfacing Chichester Gulch Summit Sect., Shaniko Fossil Rd., to E. F. Webber, Medford, **$14,691*****surfacing, oiling Cinder Butte Silver Creek Sect., Burns Lakeview Hy., and Silver Creek Sage Hen Hill Sect., Central Oregon Hy., to Babler Bros., Portland, **$77,928** ***grading, surfacing 4.86 mi. Tygh Valley Sect., Sheerer's Bridge Rd., to McNutt Bros., Eugene, **$33,893*****moving and re-establishing service station, Oregon City, to Odom Constr. Co., Salem, **$2,085*****constructing frame maintenance building at Astoria, to Helstrom & Mietet, Astoria, **$5,527.** Grand total $385,006. Bids May 22. Noted May 12, C. D.—May 14, E. N.-R.

Pennsylvania—At office W. Van Dyke, secy. Hys., Harrisburg, dual type paving, consisting of two 10 ft. rein.-con. outside lanes, 10 ft. bit. on Type B plain concrete base center lane, 2 rein.-con. structures, bit. on crushed stone surfacing 2.45 mi. Route 131, Sect. 11, Birmingham Twp., Delaware Co., to Dalton Bros., Inc., Paoli, **$174,613;** grading, drainage, extending rein.-con. structure and constructing 2 rein.-con. structures 4.57 mi. Route 88, Sect. 6, Amity and Wayne Twps., Erie Co., to A. J. Fasenmyer, Security Peoples Bldg., Erie, **$66,660.** Bids May 8. At office W. Van Dyke, secy. Hys., Harrisburg, rejected bids May 8, improving hys. Route 19001, Sect. 1, Columbia Co.; Route 26428, Fayette and Westmoreland Counties; and Routes 62048-62050, Washington Co. Noted May 18, C. D.—Apr. 30, E. N.-R.

Pennsylvania—At office W. Van Dyke, secy. Hys., Harrisburg, paving, etc., 3.39 mi. Route 157, Sects. 13-13A, Upper Macungie and Mazatawny Twps., Lehigh and Berks Counties, to J. Miller Eshelman, Landisville, **$233,834*** grading, drainage 0.8 mi. Route 53003, Sect. 1, Washington and Wayne Twps., Schuylkill Co., to D. A. Kessler, Mt. Carmel, **$24,473*** grading, drainage, 2 I-beam bridges, extension of 2 rein.-con. structures and bit. surfacing existing bridge floor 6.26 mi. Route 21008, Penn and Dickinson Twps., Cumberland Co., to W. M. Mumma, 10th and Mulberry Sts., Harrisburg, **$38,822.** Grand total $297,129. Bids May 1. At office W. Van Dyke, secy. Hys., Harrisburg, rejected bids May 1, grading, drainage, 2 rein.-con. structures, one I-beam bridge, etc., 12,876 ft. R-01063 and R-01064, Menallen Twp., Bendersville Boro, Adams Co. Noted May 8, C. D.—Apr. 28, E. N.-R.

Pa., Canton—Borough, Street Dpt., Borough Hall, bituminous asphalt paving 12 mi. streets, day labor under supervision Borough Street Dpt. **W.P.A. Est. $60,000.**

Pa., Clarion—Borough, Borough Hall, bituminous paving 3rd Ave., alley between 5th and 6th Sts., recurbing and repairing paving in various borough streets, new sewers in 3 streets, day labor under supervision of C. Imel, boro engr., Borough Hall. Est. $30,000. Owner will purchase $10,000 of materials.

Pa., Coplay—Town Council, grading, bituminous materials, paving Wall, 6th, 7th, 8th, 11th and Poplar Sts., day labor under supervision of F. Kukits, engr., c/o Town Council. $75,000. Owners will purchase materials and equipment.

★ **South Carolina**—State Hy. Dpt., Columbia, earth grading and bridge, 3.067 mi. W.P.M.S. 442 and W.P.S.O. 442, Jasper Co., and earth type surfacing and bridge, 2.85 mi. Route 33, W.P.H. 8, Bamberg Co., to H. M. Taylor, Ridgeland, **$22,882** and **$34,725** respectively*** earth type surfacing, bridging 2.366 mi. Route 265, W.P.S.S. 435 and W.P.M.S. 435 Chesterfield Co., and bituminous surfacing, bridging 4.283 mi. W.P.S.O. 395-B, Clarendon Co., to J. B. Britton, Sumter, **$47,411** and **$58,454** respectively***grading 7.266 mi. U. S. Route 15, W.P.H. 359-E, Sumter Co. and earth type surfacing 0.384 mi. Route 101, W.P.G.S. 298-C, Spartanburg Co., to Boyle Road & Bridge Co., Sumter, **$20,968** and **$20,783** respectively*** grading, bridging 13.76 mi. Route 51, W.P.S.S. 414-A and W.P.S.S. 414-B Georgetown Co., to Gregory & Poole, Virginia, Va., **$52,255***** earth type surfacing 3.792 mi. Route 73, W.P.M.S. 427-A and W.P.S.S. 427-B, Dillon Co., to Coastal Constr. Co., Florence, **$40,970***** grading 4.761 mi. Route 57, W.P.S.S. 438, Marion Co., to Hubbard Constr. Co., Marion **$48,896*****earth type surfacing 9.543 mi. Route 101, W.P.S.S. 398-B, Spartanburg Co., to C. G. Fuller, Barnwell, **$83,449*****3.106 mi. Route 18, W.P.M.H. 322, Anderson Co. and 6.515 mi. Route 31, W.P.H. 356-B, Calhoun Co., to Espy Paving & Constr. Co., 2821 Bull St., Savannah, Ga., **$30,198** and **$38,078** respectively***concrete paving 0.138 mi. Route 76, N.R.H. 75 (1935), Oconee Co. and earth type surfacing 4.132 mi. county road, also constructing 200 ft. combination bridge over Cane Creek and 100 ft. combination bridge over Crooked Creek, W.P.S.O. 417, Oconee Co., to Lokey & Anderson, Thomson, Ga., **$1,974** and **$64,375** respectively ***bituminous surfacing 1.91 mi. Route 14, W.P.S.S. 16, Ext. and W.P.S.S. 76-A, Sects. 1 and 2, Pickens Co., to W. L. Florence Constr. Co., Powder Springs, Ga. **$50,514*****6.113 mi. Route 82, N.R.S. 389-A, Contr. 2 and N.R.S. 389-B, Parts 1 and 2, Contr. 2 Anderson and Abbeville Counties, to W. F. Bowe, Jr., 540 Reynolds St., Augusta, Ga. **$21,216*****cold laid sheet asphalt Colprovia process bituminous surfacing 0.338 mi. Route 7, N.R.M. 310-D and N.R.H. 310-E, (1935) Newberry Co., to R. B. Tyler Co., 1446 Levering St., Louisville, Ky., **$14,010.** Grand total $651,167. Bids May 5. Noted May 13, C. D.

South Dakota—State Hy. Comn., Pierre, to Jarvis, Wright & Howell, Sioux Falls, grading 12.131 mi. WPSO 394, Douglas Co., **$47,645;** 4.151 mi. WPSO 408 A, Charles Mix Co., **$19,543;** 4.067 mi. WPSO 408B, Bon Homme Co., **$20,968*****to A. Graff & Co., Bismarck, N. D., 3.863 mi. WPMH 138A, Sect. 1, Lawrence Co., **$44,397;** 2.564 mi. WPMH 138, Sect. 2, same road, **$68,647*****to Summit Constr. Co., Summit, maintenance resealing 8.781 mi. FAP 22, Reop. 1, Day Co., **$899;** 22.848 mi. FAP 42 R1, 2 and 3, 9R and part 213C, Brown Co., **$2,555** ***to Iowa Road Building Co., 1495 Keo Way, Des Moines, Ia., 13.959 mi. FAP 26 R1 and part 252, Kingsbury and Brookings Counties, **$1,514;** 12.518 mi. FAP 34, Reop., Spink Co., **$1,429;** 10.869 mi. FAP 46, Reop., Hamlin Co., **$1,155*****to Lee & Johnson, Inc., Sioux City, Ia., oil surfacing 8.737 mi. FAP 22, Reop. 2, **$50,242;** 9.513 mi. FAP 22, Reop. 3, **$49,524,** both Day Co.***to W. E. Bartholow & Son Constr. Co., Huron, gravel surfacing 15.885 mi. Parts FAP 2, 98 and 102, Lincoln Co., **$10,401;** 5.524 mi. FAP 50 B, Sanborn Co., **$2,977;** 5.893 mi. part FAP 62, McCook Co., **$4,236;** 6.694 mi. part FAP 178 C, Yankton Co., **$4,570** ***to J. L. Healy Constr. Co., Sioux Falls, 2.85 mi. part FAP 3 and extension, Grant Co., **$1,679*****to Inland Constr. Co., 3867 Leavenworth Ave., Omaha, Neb., crushed rock resurfacing 35.737 mi. FAP 264 A and B, SAP 223, and Forest Rd., Lawrence and Pennington Counties, **$33,309*****to W. R. Lindekugel, Spencer, 3,640 lin.ft. guard rail, NRH and M 30A and B, Brule Co., **$1,234;** 1,780 lin.ft. WPH 240E, Stanley Co., **$827.** Grand total $367,151. Bids May 19. Noted May 11, C. D.

Tennessee—State Hy. Dpt., Nashville, widening and paving 4.819 mi. State Hy. 33, W.P.M.H. 297-B, Parts 1, 2, and part 3 extended Knox Co., to Foster & Creighton, Amer. Natl. Bank Bldg., Nashville, **$95,749*****grading, drainage 6.706 mi. Non-System Hy., W.P.S.O. 427-A, Parts 1 and 2, Henry Co., to T. M. Strider & Co., Cotton States Bldg., Nashville, **$108,738*** grading, drainage 2.863 mi. Non-System Hy., from Route 24, W.P.S.O. 439-A, Putnam and Smith Counties, to Marion Constr. Co., Nashville, **$54,723*****grading, drainage, relocating 0.962 mi. Route 58, near Sherwood, W.P.G.S. 471-A, Franklin Co., to Walters & Prater, Mortistown, **$56,711.** Grand total $315,921. Bids May 22, awarded May 25. Noted May 27, C. D.—May 14, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, concrete paving 1.033 mi. State Hy. 244, Control 501-1-1, Brazos Co., to Central Bitulithic Co., P. O. Box 5343, Dallas, **$52,763.** Est. $60,000. Bids Apr. 28. Noted May 14, C. D.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, grading base, drainage 0.4 mi. Project WPSO 173-B, Salisbury, to Bristol Contr. Co., Inc., 1 Pleasant St., Bristol, N. H., **$7,499*****3.4 mi. Route 30, Project 180-L and 159-L, Jamaica and Townsend, to A. O. Priest, Belmont, **$55,692***** one course concrete paving, bituminous macadam shoulders 0.3 mi. Route 12, Project WPMH 78-I, Northfield Village, to Robie Constr. Co., Inc., 1042 Elm St., Manchester, N. H., **$24,164*****bituminous macadam surfacing 0.2 mi. Route 8, Project 193-L, Whitingham, to E. H. Lewis, 6 Carisbrook St., Andover, Mass., **$9,919*****crushed stone mixed in place surface course with refined tar and

†Federal Government

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The reputation of Bay City as builders of cranes, draglines and shovels of real quality and stamina has resulted from modern engineering. Shovel sizes from ⅜ yd. to 1¼ yd. capacities, full revolving and convertible, combine speed, power and built-in endurance that means more yardage and larger profits at the end of a day's work. No matter what your requirements it will pay you to investigate the "25 REASONS for CHOOSING BAY CITY."

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⅜ yd. (Tractor Shovel)	¾ Circle
½ yd.	30
⅝ yd.	38
¾ yd.	43
⅞ yd.	52
1 yd.	62
1¼ yd.	65

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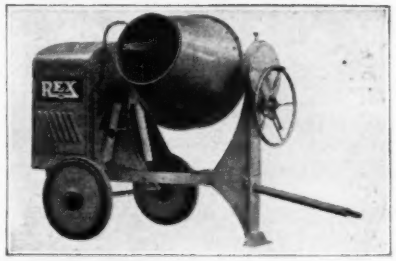

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36-9

Streets and Roads (Continued)

cut back asphalt paving 1.7 mi. Route 14, Project WPSS 181-B, Barre and East Montpelier, to E. C. Hayden, R.F.D. 3, Barre, $53,986. Grand total $151,240. Bids May 8, 15 and Apr. 28. Noted Apr. 30, May 18 and 25, C. D.

Wash., Seattle—City, paving, watermains in Franklin Ave. and adjacent streets, to L. J. Dowell, 1437 Elliott Ave. W., $41,083. Est. $42,854. Bids May 7, awarded May 21. Noted May 13, C. D.—May 21, E. N.-R.

Wisconsin — State Hy. Comn., Lancaster, crushed stone surface course 5.68 mi. Bloomington Patch Grove Rd., S.T.H. 35, State Project 9505, to Interstate Constr. Co., Cobb, $8,-251; 11.3 mi. Muscoda-Richland Center Rd., S.T.H. 80, Richland Co., to P. W. Ryan Sons, Janesville, $13,532. Bids May 14. Noted May 8, C. D.

Alta., Edmonton—Alberta Provincial Govt., grading, graveling 26 mi. road from Lethbridge to Picture Butte and Iron Springs, to F. Manix, Calgary, $60,000. Noted May 6, C. D.—May 14, E. N.-R.

Ont., Toronto—Toronto Transportation Comn., 35 Yonge St., asphalt work in connection with street railway track replacement, to Rayner Constr. Ltd., 29 Commercial St., Leaside. Est. $400,000. W. E. P. Duncan, c/o owner, engr. Noted May 4, C. D.—May 7, E. N.-R., under "Materials and Equipment, Contracts Awarded."

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

†**Calif., Sacramento**—U. S. Eng., New Post Office Bldg., completing specifications levee construction on Sacramento River, near Moulton Weir, incl. 390,000 cu.yd. embankment.

Colo., Colorado Springs—State, U. S. Bureau P. Roads, City, Atchison, Topeka & Santa Fe R.R., G. W. Harris, ch. engr., Chicago, Ill., Colorado & Southern R.R., R. C. Gowdy, ch. engr., Denver, Denver, Rio Grande & Western R.R., A. O. Ridgway, ch. engr., Denver, and Fountain Valley User's Assn., preliminary plans for dam checks, dredging, channel straightening and reinforcing levees along Fountain and Monument Creeks for flood protection. Edward Foster, Denver, dir. State Planning Comn.

★ †**Nebraska**—U. S. Eng., Omaha, soon takes bids constructing 11,000 ft. pile dikes and 11,000 ft. pile revetment in Missouri River near Florence from Rockport to Florence Bends $550,000.

Neb., North Platte—Platte Valley Public Power & Irrigation Dist., North Platte, plans installing water by-pass and 3rd turbine unit at North Platte Power House. $330,000. P.W.A. project.

Nev., Fallon—Fallon Irrigation Dist., G. S. Scheer, engr., 2967 Piedmont Ave., Berkeley, making surveys installing Diesel plant at Lahontan $125,000, installing hydro-electric unit at end of Truckee Canal to generate power during non-irrigating seasons while water is entering Lahontan Reservoir, or to purchase power for district from outside sources.

★ **New York**—Dpt. Canals & Waterways, H. O. Schermerhorn, comr., State Office Bldg., Albany, bids after June 25, deepening and dredging in barge canal between Hudson River and Lock 8, at Scotia. $2,000,000. P.W.A. project.

Pa., Wilkes-Barre—City, H. Weiss, clk., tentative plans being prepared by W. P. Johns, city engr., City Hall, dredging Solomon's Creek from city line to Waller St. To exceed $14,000. Will probably be a W.P.A. project.

★ †**Texas**—U. S. Eng., Wash., D. C., preliminary surveys, etc. for flood control of Nueces and Frio Rivers, near Corpus Christi. Est. about $1,500,000.

★ **Tex., Blanco City**—Guadalupe and Blanco Rivers Authority, c/o A. Henne, New Braunfels, plans large dam on Blanco River, near here, for power, irrigation and flood prevention. $2,500,000. Bids will be received when funds become available. P.W.A. project. Federal Bd. authorized final approval of project. Terrell Bartlett Engineers, Milam Bldg., San Antonio, engrs. Southwest Eng. Co., New Braunfels and Austin, consult. engrs.

Tex., Cooper—Delta Co. Levee Impvt. Dist. 2, c/o J. M. Boyd, Cooper, filed application with P.W.A. for loan and grant to finance construction of levee and channel project, clearing, grubbing, excavating and earth embankment, sluice gates and raising height of present levee $35,000. W. F. Hicks, Paris, engr.

★ **Tex., Jacksonville** — Sabine-Neches Conservation Dist., c/o C. K. De Bush, chn., Jacksonville, filed application with P.W.A. for loan and grant to finance construction of dams, reservoirs, channel improvements, to serve as flood protection, irrigation and power. $9,856,-303. P.W.A. project. Myers, Noyes & Forrest, Tower Petroleum Bldg., Dallas and c/o District Bd., engrs.

★ **Tex., New Braunfels**—Colorado and Blanco River Authorities, c/o A. Henne, chn. Bd., New Braunfels, plans soon completed constructing series of small dams on the Guadalupe and Blanco Rivers, power, irrigation, flood prevention. $845,000. P.W.A. project. Federal P.W.A. Bd., Washington, D. C., approved project. Bids when funds become available. Terrell Bartlett Engineers, Milam Bldg., San Antonio, engrs.

★ **Tex., New Braunfels**—Guadalupe River Authority, c/o A. Henne, New Braunfels, chn., plans constructing large power dam at Hunter Springs, near here, incl. clearance of river where needed. $2,500,000. P.W.A. project. Engineers report approved and now awaiting allocation of funds before calling for bids. Southwest Eng. Co., Austin, engrs. and Terrell Bartlett Engineers, Milam Bldg., San Antonio, consult. engrs. Noted May 26, C. D.—Sept. 19, E. N.-R.

BIDS ASKED

†**Arizona, California and Nevada**—June 23, by Bureau Reclamation, Dpt. Interior, Federal Bldg., Yuma, Ariz., constructing 748,000 cu.yd. earthwork, Sta. 3325 to Sta. 3538 plus 50, All-American Canal, Boulder Canyon Project, 2 to 5 mi. east of Calexico, Calif., Spec. 686.

†**Arkansas**—U. S. Eng., P. O. Box 667, Vicksburg, Miss., taking bids constructing 4,905,000 cu.yd. earthwork on west bank of Mississippi River and 997,000 cu.yd. earthwork on south bank Arkansas River.

†**Florida**—June 15, by U. S. Eng., Jacksonville, dredging 9,359 cu.yd. material from Homosassa River, near its entrance to Gulf of Mexico.

†**Florida**—July 1, by U. S. Eng., Post Office and Court House Bldg., Jacksonville, dredging 1,200,000 cu.yd. from channel across Indian River, and widening entrance, deepening turning basin and channel across Indian River, Fort Pierce Harbor.

†**Florida**—July 2, by U. S. Eng., Post Office and Court House, Jacksonville, jetty construction consisting of removing an obstructive land point at entrance, restoring present jetties, etc., at Lake Worth Inlet.

†**Florida**—July 2, by U. S. Eng., Post Office and Court House, Jacksonville, dredging 251,700 cu.yd. unclassified material, incl. 60,300 cu.yd. rock, in enlarging turning basin, widening channel across Lake Worth.

†**Ga., Savannah** — June 11, by U. S. Eng., Savannah, dredging 1,553,000 cu.yd. materials at Savannah Harbor.

†**Ga., Savannah**—June 12, by U. S. Eng., Savannah, dredging 2,809,000 cu.yd. materials in Savannah Harbor.

†**Ga., Savannah** — June 13, by U. S. Eng., dredging 1,220,000 cu.yd. at Savannah Harbor.

†**Illinois**—June 16, by U. S. Eng., Post Office Bldg., Chicago, dredging 179,000 cu.yd. rock and 239,000 cu.yd. earth in Miles 230 and 231, Illinois Waterway.

†**Illinois**—June 17, by U. S. Eng., Post Office Bldg., Chicago, dredging 588,300 cu.yd. place measurement earth excav. in Peoria Pool, from Miles 223.2 and 229.7, Illinois Waterway upstream from Grafton to point near Utica. Noted May 22, C. D.—May 28, E. N.-R.

†**Illinois**—June 19, by U. S. Eng., 932 Post Office Bldg., Chicago, removing and disposing of material to depth of 10 ft. below proposed LaGrange Pool elevation of Illinois Waterway located from point 133.5 mi. upstream from Grafton to point 157.7 mi. upstream from Grafton; Items (1) include 1,387,300 cu.yd. place measurement earth excav., (2) 1,651,600 cu.yd. place measurement earth excav., (3) 2,062,600 cu.yd. place measurement earth excav., (4) 1,618,700 cu.yd. place measurement earth excav., (5) 1,182,900 cu.yd. place measurement earth excav.

†**Illinois**—June 20, by U. S. Eng., 932 U. S. Post Office, Canal and Van Buren Sts., Chicago, dredging and disposing of earth in Alton Pool, Illinois Waterway, Sect. 1, 1,413,000 cu.yd. and Sect. 2, 2,006,600 cu.yd. Noted May 22, C.D. —May 28, E.N.-R.

†**Ia., Burlington**—June 25, by U. S. Eng., Clock Tower Bldg., Rock Island, Ill., constructing and installing power, control and lighting system at Lock and Dam 18, Mississippi River above here.

†**Ia., Dubuque**—June 24, by U. S. Eng., Clock Tower, Rock Island, Ill., constructing and installing power, control and lighting system at Lock and Dam 11, Mississippi River, near here.

†**Michigan**—June 10, by U. S. Eng., 408 Federal Bldg., Milwaukee, Wis., dredging 48,000 cu.yd. from Grays Reef Passage. Noted May 18, C.D.—May 21, E.N.-R.

†**Mich., Ludington**—June 25, by U. S. Eng., Milwaukee, Wis., constructing 2,330 ft. concrete superstructure on crib and pile pier shore connections, here.

†**Minn., Grand Marais**—June 26, by U. S. Eng., Duluth, dredging 91,000 cu.yd. other than ledge rock in Grand Marais Harbor.

†**Mo., Clarksville**—June 19, by U. S. Eng., U. S. Court and Custom House, St. Louis, constructing Lock 24, Mississippi River, 93.5 mi. upstream from St. Louis. Noted May 22, C.D. —May 28, E.N.-R.

N. J., Irvington—See "Contracts Awarded."

N. J., Millburn—See "Contracts Awarded."

†**New York** — June 18, by U. S. Eng., Army Bldg., 39 Whitehall St., New York, dredging 2,568,700 cu.yd. material in Kill Van Kull Connecting Channel, Upper Bay, New York Harbor.

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†*Federal Government*

Earthwork, etc. (Continued)

†**N. Y., New York**—June 26, by U. S. Eng., Army Bldg., 39 Whitehall St., dredging 2,662,000 cu.yd. place measurement excav., in Upper Bay, New York Harbor.

†**Pennsylvania**—June 9, by U. S. Eng., Phila., dredging 13,266,700 cu.yd. in Inland Waterway, Delaware River to Chesapeake Bay.

Pa., Williamsport—See "Contracts Awarded."

CONTRACTS AWARDED

†**California** — bureau Reclamation, Old Post Office Bldg., Sacramento, excavation for investigation of Friant Damsite, Spec. 775 D, to Youdall Constr. Co., Matson Bldg., San Francisco, $16,125. Bids Apr. 2. Noted Apr. 10, C. D.—Mar. 26, E. N.-R.

†**Idaho**—Bureau Reclamation, Ashton, clearing land for Island Park Reservoir site on Upper Snake River Reclamation Project, to Nevada Constr. Co., Nevada, Mo., $66,890. Bids May 4. Noted May 22, C. D.—Apr. 23, E. N.-R.

Idaho, Caldwell—Pioneer Irrigation Dist., constructing 5 drainage ditches, to J. A. Terteling & Sons, 2223 Fairview Ave., Boise, $19,186. P.W.A. Noted Apr. 17, C. D.

†**Louisiana**—U. S. Eng., Vicksburg, Miss., constructing 22,950 cu.yd. earthwork in Ouachita River, to Forcum-James Co., Dyersburg, Tenn., $10,327. Bids May 12. Noted May 8, C.D.

†**Montana** — Bureau Reclamation, Missoula, constructing O'Keefe Wasteway and canal structures, lining main canal on Frenchtown, Mont. Federal Reclamation Project, to R. Davis, Conor, $47,312. Bids Apr. 27. Noted Apr. 2, C. D.—Apr. 9, E. N.-R.

Neb., Hastings — Central Nebraska Public Power & Irrigation Dist., 3rd St. and St. Joseph Ave., constructing Keystone Reservoir Dam, 1,000 ft. stripping, 1,000 cu.yd. overhaul, 10 acres clearing and grubbing, 40,000 cu.yd. trench excav., soil testing shaft and additional soil testing shafts; constructing Jeffrey Canyon Reservoir, incl. 10,000 cu.yd. stripping, 2,000 cu.yd. overhaul, 10 acres clearing and grubbing, 7,000 cu.yd. trench excav., 10 acres scoring, and constructing Johnson Reservoir, incl. 16,000 cu.yd. stripping, 1,000 cu.yd. overhaul, 5 acres clearing and grubbing, 10,000 cu.yd. trench excav., 9 acres scoring, to M. C. Walker & Son, 1200 1st Natl. Bank Bldg., Omaha, $14,230. Bids Apr. 15. Noted May 8, C. D.—Apr. 9, E. N.-R.

N. J., Glen Ridge—Town, Town Hall, constructing 3,000 ft. rubble masonry wall and clearing Tony's Brook. City will purchase sand for concrete footings. W.P.A. will purchase cement and other materials, through Procurement Div., 1060 Broad St. M. Aeschenfelder, in charge of labor. $26,000 plus. **W.P.A.** Noted Oct. 19, 1933, C. D.—Oct. 26, E. N.-R.

N. J., Irvington—Town, Town Hall, over 1/3 mi. rubble stone wall 12 ft. high, along Elizabeth River between Yale and Chancellor Ave., as flood control prevention, day labor, I. J. Casey, engr., in charge. $85,000 plus. **W.P.A.** Town will furnish stone, W.P.A. will purchase other materials.

N. J., Millburn—Essex Co. Park Comn., 115 Clifton Ave., Newark, excavating 6,000 cu.yd. silt at Diamond Mill Pond, South Mountain Reservation, and constructing earth berm on East Side Pond. **W.P.A.** labor, H. J. Phillips, in charge. County will purchase lumber and W.P.A. will purchase tools and supply labor. $22,200.

Pa., Williamsport — Comrs. Lycoming Co., cleaning, dredging, diking and cribbing Muncy Creek from Susquehanna River to Picture Rocks, distance of 10.6 mi. Flood Control Project, day labor under supervision of M. C. Krause, co. engr., 10 West 4th St. Est. $95,000. County will purchase $11,800 worth of materials, equipment and tools for project.

Tex., Port Lavaca—City, c/o F. M. Dudgeon, mayor, dredging 59,000 material, etc., furnishing 500 tons rip rap, to Ohlhausen Dredging Co., 8201 Elm St., Houston, $21,902; constructing 2 boat docks, 2 creosote sheet pile bulkheads, to Stromer Constr. Co., Victoria. Total est. $22,000. **P.W.A.** Noted May 20, C.D.—Apr. 30, E.N.-R.

N. B., Escuminac—Secretary Dpt. P. Wks., Ottawa, Ont., constructing breakwater extension, to B. F. Somers & J. F. Kingston, Newcastle, $22,178. Est. $34,000. Noted May 1, C. D.—May 7, E. N.-R.

UNCLASSIFIED

PROPOSED WORK

Calif., Bakersfield—SWIMMING POOLS—City, election July 21, $117,580 bonds for 3 swimming pools, estimated to cost $98,580 and $19,000 for purchase of property adjoining Beale Park. Noted Apr. 29, C. D.—May 7, E. N.-R.

★ **Calif., Sacramento** — DISTRIBUTING SYSTEM—Sacramento Municipal Utility Dist., commissioned L. S. Ready, Rialto Bldg., and H. G. Butler, 111 Sutter St., San Francisco, consult. engrs., to prepare report on comparative costs of constructing a new distributing system in the district and purchasing the existing electrical distributing system of the Pacific Gas & Electric Co. A bond issue of $12,000,000 has already been authorized by the district for purchase or construction of a power supply and a distributing system.

Conn., Bristol—DEVELOPMENT WORK—J. T. Donovan, 33 North Main St., making plans development work on 50 acre tract Cedar Lake, provisions to be made for 45 building lots on 2,000 ft. lake front. Est. $140,000. Sperry & Buell, Inc., 175 Main St., Bristol, engrs. Owner has started development work.

Conn., Terryville—DEVELOPMENT—C. Allen, Sylvan Hill, drawing layout plans Terryville acreage to provide facilities for 65 house sites. $140,000. Sperry & Buell, Inc., 175 Main St., engrs.

Ind., Muncie—PARK—City plans purchasing six acres additional ground for Tuhey Park addition and improving same. $25,000.

★ **Ind., Muncie**—RAILROAD YARDS—Cleveland, Cincinnati, Chicago & St. Louis R.R., W. S. Burnett, ch. engr., 230 East 9th St., Cincinnati, O., plans moving downtown switching yards to West Muncie beyond city limits and adding to Hart Yards•••New York, Chicago & St. Louis R.R. Co., A. C. Harvey, ch. engr., Terminal Tower, Cleveland, O., plans removing tracks from Madison St. and building yards near Lincoln St., or east of White River, adjacent to C. & O. Railway Yards•••Chesapeake & Ohio Ry. Co., C. W. Johns, ch. engr., Richmond, Va., plans removing yards to east of White River, possibly combining with New York, Chicago & St. Louis R.R. lines in union yard. Est. about $500,000.

La., Sulphur—RIP RAP—W. T. Burton Oil Co., Sulphur, asked permission of War Dpt., for installation of rip rap and construction of backfill bulkhead within an existing slip on south bank of Calcasieu River, 4,800 ft. from highway bridge at Lake Charles, Calcasieu Parish.

La., Sulphur—OIL PIPE LINES—Union Sulphur Co., Sulphur, asked permission of War Dpt. to lay twelve 4 in. oil pipe lines on the bottom, under and across Powell Bay at site of existing bridge across Powell Bay, near Lake Charles, in Calcasieu Parish. Private plans.

Me., Sanford—PARK—Town, R. Emery, chn. Park Comn., Town Hall, plans improving park, grading, etc. $26,000. **Maturity indefinite.**

★ **Missouri**—RAILROAD—Judge C. B. Davis, U. S. District Court, St. Louis, has set June 9, for hearing on recommendation of Berryman Henwood, Federal Trustee, for St. Louis Southwestern Ry., W. S. Hankey, ch. engr., Tyler, Tex., constructing additions, betterments and maintenance, incl. 25 mi. new track between Rockview and Zeta $217,752, maintenance work on various sections $460,504. Total cost $1,933,203.

Mo., Columbia—RURAL ELECTRIFICATION—Boone County Electric Co-Operative Assn., plans constructing rural electric lines in Boone Co. $65,000 allotted by Rural Electrification Administration in Wash., D. C.

Nebraska—TRANSMISSION LINES—Lancaster County Rural Pub. Serv. Dist., Walton, constructing 354 mi. transmission and distribution lines, to serve 900 customers. $396,000 loan to be allotted. The district plans to purchase its electric supply from Loup River Public Power Dist., 2307 13th St., Columbus.

N. Y., Brooklyn—GOLF LINKS, etc.—Dpt. Parks, Arsenal Bldg., Central Park, New York, plans by A. Embury, 2nd. archt., c/o owner, constructing golf course and club house, 902 86th St. $40,000.

N. Y., Brooklyn — PARK DRAINAGE SYSTEM — Dpt. Parks, Arsenal Bldg., Central Park, New York, plans by A. Embury, engr. and archt., c/o owner, constructing park drainage system, Owls Head Park. Est. about $30,000.

N. Y., Yonkers—STADIUM, etc.—Bd. Supervs. Westchester Co., Court House, White Plains, will not construct stadium and development of Tibbetts Brook near here, also park and stadium on Central Park Ave., near Cross County Parkway, Yonkers, owing to strenuous objections from taxpayers. $70,000. Project abandoned. Noted Apr. 8, C. D.—Apr. 16, E. N.-R.

N. C., Wilson—SWIMMING POOL—Town filed application with P.W.A. for loan and grant to finance construction swimming pool. $43,637.

Okla., Lawton—ELECTRICAL LINES—Wolverton Bros., Lawton, plans constructing 85 mi. 13,200 volt and 2,300 volt rural electric lines. $60,000. Private plans.

Pa., Erie—DOCK IMPROVEMENTS—Erie Sand & Gravel Co., foot of Sassafrass St., plans improvements and extensions to docking facilities at company's plant, foot of Sassafrass St., Erie Harbor. $25,000. **Maturity soon.**

Pa., Franklin—RECREATION CENTER, etc. Franklin Borough, Borough Hall, S. E. Dickey boro. engr., plans developing modern recreation center and athletic field, dance pavilion and other buildings, Franklin Boro in Cambria Co. Probably W.P.A. project. $25,000.

Tenn., Paris—DISTRIBUTION SYSTEM—City voted $300,000 bonds to finance construction of electric distribution system, incl. power substation facilities. W. H. Dudley, city treas. J. S. Watkins, Citizens Bank Bldg., Lexington, engr., in charge of plans for project.

†*Federal Government*

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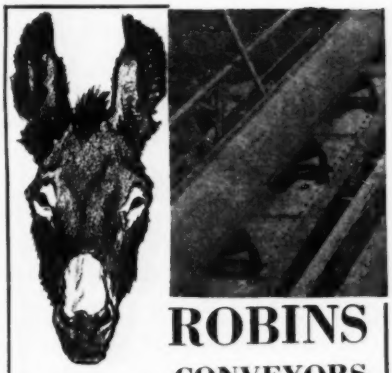

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Unclassified (Continued)

Ont., Byron—GAS—Election June 8 to grant City Gas Co., 215 Dundas St., London, W. L. Duffield, mgr., franchise to lay gas mains and distribute gas for all general purposes. $40,000.

Que., Quebec City—SUBWAYS—Municipality making plans subways at Crown and Bridge Sts. $100,000.

BIDS ASKED

†Alabama — **TRANSMISSION LINES** — June 26, by Tennessee Valley Authority, Knoxville, Tenn., constructing 65 mi. transmission line from Wheeler Dam to Guntharsville Dam. C. H. Garity, Knoxville, Tenn., dir. Purchases.

California—NATURAL GAS PIPE LINE—See "Contracts Awarded."

Colorado—TELEPHONE LINE—See "Contracts Awarded."

†Ill., Rock Island—POWER CONTROL—June 24, by U. S. Eng., Rock Island, power control and lighting system at Lock and Dam 11, Mississippi River. Noted Nov. 19, C.D.—Nov. 21, E.N.-R.

Kansas—PIPE LINE—White Eagle Oil Co., c/o Socony-Vacuum Oil Co., 26 Bway., New York, taking bids laying 178 mi. 6 in. steel gasoline pipe line from Augusta to Kansas City.

Mo., Ferguson — SUBDIVISION DEVELOPMENT—See "Contracts Awarded."

N. J., Newark — PARK BUILDINGS — See "Contracts Awarded."

N. Y., Brooklyn—PLAYGROUND, etc.—See "Contracts Awarded."

N. Y., Syracuse — PARKS — See "Contracts Awarded."

O., Cleveland—LANDING FIELD—Goodyear Tire & Rubber Co., 1144 East Market St., Akron, taking bids 500x500 ft. landing field for aircraft on Great Lakes Exhibition Grounds. P. C. Van Arsdale, c/o owner, engr.

Pa., Lafayette—CEMETERY DEVELOPMENT—See "Contracts Awarded."

Texas—OIL and GAS DEVELOPMENT—See "Contracts Awarded."

†Va., Dahlgren—LANDING FIELD—June 10, by Yards & Docks, Navy Dpt., Wash., D. C., constructing landing field, Spec. 7951.

LOW BIDDERS

★ **N. Y., Flushing**—FAIR—Dpt. Parks, Arsenal Bldg., Central Park, New York, May 27, grading Flushing Meadows Park site for George Washington Inaugural Fair, from D. M. W. Contg. Co., 165 East 115th St., New York, $1,843,775. Noted May 11, C. D.—May 14, E. N.-R.

CONTRACTS AWARDED

California—NATURAL GAS PIPE LINE—San Diego Consolidated Gas & Electric Co., Electric Bldg., 15 mi. 2½ in. and 3 in. Standard natural gas pipe line from main at Carlsbad to Escondido, force account. Est. $60,000. Pipe to Western Metal Supply Co., San Diego.

Calif., Los Angeles—WHARF—Coos Bay Lumber Co., 403 West 8th St., constructing wharf, paving tracks and fence at Berth 129, Wilmington, to Merritt, Chapman & Scott, San Pedro, about $59,000.

Calif., Oakland—TRANSIT SHED—City Port Comn., constructing superstructure for Transit Shed Extension 2, to E. T. Lesure, 87 Ross Circle, $53,858. Bids May 4, awarded May 19. Noted May 20, C. D.

Colorado — **TELEPHONE LINE** — Mountain States Telephone & Telegraph Co., 931 14th St., Denver, 75 mi. new wire and part new poles for new telephone line from Monte Vista to Platboro, day labor.

★ **Ia., Chariton**—RAILROAD—Chicago, Burlington & Quincy R.R. Co., A. W. Newton, ch. engr., 547 West Jackson Blvd., Chicago, Ill., grading, cut down of huge hill, double tracking 5 mi. track, detouring around Whitebreast Hill, grading only, to Edward Peterson Co., 708 WOW Bldg., Omaha, Neb., to exceed $1,000,000. Total est. $2,000,000.

Mass., Roxbury—WADING POOL, etc.—A. Singarella, general contractor, 22 A Tremlett St., Dorchester, plumbing for wading pool, locker buildings, etc., to Wm. N. McKenna Co., 79 Chestnut St., Boston, for City of Boston, trustees of Geo. Robt. White Fund, City Hall Annex•••painting, to A. W. Anderson Co., 60 West Dedham St., Boston•••roofing, to Atlantic Roofing & Skylight Wks., 19 Howard St., Roxbury•••steel sash and reinforcing steel, to Truscon Steel Co., 38 Chauncy St., Boston••ornamental iron and struetural steel, to Progressive Iron Wks., Inc., 150 4th St., Chelsea•••lathe and plaster, to A. L. Bacon, 241 Mystic St., Arlington. Noted May 14, C. D.—May 21, E. N.-R., under "Contracts Awarded."

Mich., Grosse Ile—SWIMMING POOL, etc.—Grosse Ile Twp., 1 story, 30x75 ft., concrete, swimming pool and brick, concrete bathhouse, to Barton Malow Co., 1900 Jefferson Ave., Detroit. Est. $50,000. O'Dell & Roland, 90 Stimson Pl., Detroit, archt.

★ **Missouri and Illinois**—PIPE LINE—**Texas** Empire Pipe Line Co., Philtower Bldg., Tulsa, Okla., 35,000 tons 12¾ in. steel pipe for pipe line, to A. O. Smith Corp., 3533 North 27th St., Milwaukee, Wis., and to Republic Steel Corp. 335 Market St., Youngstown, O. Est. $2,500,000.

Mo., Ferguson — SUBDIVISION DEVELOPMENT—Moresi-Nauman O'Neil Constr. Co., 2700 North Grand Blvd., developing 20 acres in subdivision known as Patricia Park, incl. entrance gates, sidewalks, 8- to 18-in. sewers, concrete sidewalks, gas and electric lines, constructing 82 American colonial type 1½ story, brick bungalows, to exceed $4,500 each, own forces. Private plans. City will construct streets, sewers, sidewalks, etc. $15,000.

Mo., Kansas City—RAILROADS—See "Materials and Equipment."

New Jersey—HIGH SPEED LINE—J. K. Costello secy. Delaware River Joint Comn., Administration Bldg., Bridge Plaza, Camden, Contr. 16, repaving in Phila., Pa., and Camden, N. J., for high-speed rail transit line to Union Paving Co., 1227 North Broad St., Phila., Pa., $52,578. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

N. J., Newark—SUBWAY—City, Dpt. P. Affairs, City Hall, May 21, constructing subway partly underground and partly open cut from new Penn. R.R. station to town line, Newark and Belleville, Sect. 1, city railway loop under new Penn. Station, from Railway Industrial Constr. & Repair Co., 262 Paulson Ave., Passaic, $35,405. Est. $50,000. Noted May 6, C. D.—May 14, E. N.-R.

N. Y., Batavia—PARK, etc.—Village, constructing Kibbe Recreation Park, incl. tennis courts, playground, walks, drives, planting, seeding, baseball and football fields and playground equipment, relief labor. $25,600. **W.P.A.**

N. Y., Brooklyn—PLAYGROUND, etc.—Dpt. Parks, Arsenal Bldg., Central Park, New York, constructing playground and wading pool, Avenue W and West 10th and 11th Sts., relief labor. To exceed $30,000. **W.P.A.** Owner will purchase materials. A. Embury, 2nd, c/o owner, archt. and engr.

N. Y., Glens Falls—WALL—Glens Falls Portland Cement Co., Glens Falls, 80 ft., rein.-con. wall, 45 ft. high to brace existing wall, to Kingsbury Constr. Co., 158 Main St., Hudson Falls. Est. exceeds $23,000. Private plans.

N. Y., Long Beach—BOARDWALK—**Faircroft** Eng. Co., general contractors, 16 Court St., Brooklyn, 1,700 tons reinforcing steel for boardwalk and comfort station, for City Council, City Hall, to J. T. Ryerson & Son, 203 Woodside Ave., Jersey City, N. J. Noted May 13, C. D.—May 21, E. N.-R.

N. Y., Syracuse—PARKS—City, R. D. Marvin, mayor, City Hall, improving city parks, incl. grading, planting, seeding, walks, relief labor. $107,000. **W.P.A.** G. L. Noble, Old Post Office Bldg., Syracuse, procurement officer W.P.A., will purchase materials.

N. Y., Woodbridge — SWIMMING POOL — Michael Deutsch, Woodbridge, rein.-con. swimming pool with filtering and chlorinating system, to J. Bullock, Lock Sheldrake. Noted Apr. 8, C. D.—Apr. 16, E. N.-R.

Pa., Lafayette—CEMETERY DEVELOPMENT—McKean Co. Memorial Park, Inc., P. P. Lyon, pres., Pine St., Bradford, cemetery development, 108 acre plot, grading, native stone entrance columns and walls, singing tower and fountain, stone and concrete, 60 ft. diam., 60 ft. high, driveways, artificial lake. Owner will do most of work by day labor. Grading, drives and landscaping, to G. W. McClure, 590 Richmond Ave., Buffalo. Est. $200,000. T. K. Hendryx, 404 Odd Fellows Bldg., Bradford, archt.

Texas—OIL and GAS DEVELOPMENT—Corporation, c/o J. G. Ellinghausen, Kennedy Bldg., Tulsa, Okla., oil and gas development in East Texas fields, day labor and separate contracts. To exceed $50,000. Owner will purchase materials.

MATERIALS AND EQUIPMENT

PROPOSED WORK

TRACTORS — **Hartford, Conn.** — City, Fire Comn., W. A. Haupt, chn., plans purchasing 2 tractors for aerial fire trucks. $10,000.

TRUCKS—Litchfield, Minn.—Meeker Co., J. Simonson, aud., bids in fall, purchasing 2 trucks and snow-plow attachments. C. R. Patterson, co. hy. engr.

TANKS—St. Louis, Mo.—M. C. Early, Wainwright Bldg., granted permit to install three 1,000 gal. underground steel tanks for gasoline at service station, 2286 South Kingshighway Blvd.

★ **†PORTLAND CEMENT—Fort Peck, Mont.**—U. E. Eng. Kansas City, Mo., soon takes bids 600,000 bbl. alkali resisting portland cement for Fort Peck Dam. $1,650,000.

IRON PIPE—Jersey City, N. J.—Public Service Corp. of New Jersey, Jersey City, plans purchasing 7,000 tons 4, 6, and 8 in. c.i. pipe in near future.

CRUSHED STONE—Albany, N. Y.—Dpt. P. Wks., Albany, J. E. Sheary, ch. aud., in charge, soon takes bids 10,000 tons crushed stone for highway maintenance and repairs. To exceed $10,000. T. F. Farrell, state hy. engr.

TANK—Buffalo, N. Y.—D. P. Rumsey & Co., Ellicott Sq. Bldg., plans purchasing 500 or 1,000 gal. gasoline storage tank for service station, 337 South Park Ave. To exceed $1,000. Pure Oil Co., Ellicott Sq. Bldg., lessee.

MOTOR PUMPER TRUCK—East Chili, N. Y.—Riverdale Volunteer Fire Dpt., East Chili, plans purchasing new motor pumper truck, with booster tank, 1,000 ft. or more 2½ in. fire hose and fire fighting equipment. $40,000.

SEPTIC TANKS—Irvington, N. Y.—Girard Matthiessen, Tiffany Park, Irvington, will not purchase septic tanks. Village Bd. Trustees disapproved of project due to proximity of reservoir. Noted May 19, C. D.—May 21, E. N.-R.

MOTOR TRUCKS—Jamestown, N. Y.—Bd. P. Utilities, City Hall, plans purchasing 4 new motor trucks for Water & Light Divs. $4,000. **Maturity in June.** C. O. Johnson, supt.

TANKS—Liverpool, N. Y.—Hartol Products Corp., M. Getzoff, mgr., Cold Springs Rd., plans constructing additional gasoline and oil storage tanks, near Cold Spring Rd. To exceed $1,000.

TANKS—Liverpool, N. Y.—Southern Oil Co. of New York, 1430 Erie Blvd., East Syracuse, plans purchasing additional steel gasoline and oil storage tanks, near Cold Spring Bridge. To exceed $1,000.

STEEL TANKS — Sherman, N. Y. — Glenn Newhouse, Taggart Bldg., plans installing 500 gal. steel tanks, electric pump, air compressor, etc. at gasoline service station and repair shop, Main St. To exceed $1,000. Owner will also purchase tools and equipment for general automotive service shop.

TANKS — Utica, N. Y. — Richfield Oil Co., Utica, plans constructing 5 large steel storage tanks in Wurz Ave., also warehouse, office and garage. $25,000.

GARBAGE TRUCKS—Cleveland, O.—City, F. Milton, purch. agt., soon takes bids 25 garbage trucks.

PAVING MATERIALS—Cleveland, O.—City, F. Milton, purch. agt., soon takes bids 1,000 tons bituminous paving materials.

TRUCKS — **Cleveland, O.** — City, F. Milton, purch. agt., soon takes bids furnishing one 2 ton closed body truck, for markets; one 1½ ton stake body truck for recreation; one sedan automobile, one spraying machine for horticulture; two tractors, four 1½ ton dump trucks, for parks; one 5 ton truck with snow plow attachment for airport; one 1½ ton dump truck, one ½ ton pick-up truck, one multigang Fairway mower; two 24 in. greens mowing machines, for golf; four 1½ ton dump trucks for cemeteries; one 1½ ton stakebody truck, for auditorium.

WINCH TRUNKS, etc.—Cleveland, O.—City, F. Milton, purch. agt., soon takes bids furnishing 4 special winch trunks, 4 motor driven street sweepers and 5 road scrapers.

ROAD ROLLER—Conemaugh, Pa.—Supervs. Conemaugh Twp. plan purchasing 10 ton road roller, $5,000.

STEEL TANKS, etc.—Phila., Pa.—A. Steiger, 3312 Jasper St., plans installing 500 gal. steel tanks, electric pump, air compressor, etc., at service station and garage to be built at 4th and Vollmer Sts. To exceed $1,000.

STEEL TANKS, etc.—Wilkes-Barre, Pa.—Socony-Vacuum Oil Co., Rockefeller Plaza, New York, plans installing 500 and 1,000 gal. steel tanks, electric pumps, air compressor, etc., at gasoline service station to be built at Carey Ave. and Academy St. To exceed $1,000.

ROAD MATERIALS—Simcoe, Ont.—Guy R. Marston, engr., Norfolk Co., Court House, interested in prices of all materials for tar surfacing county roads. $109,350 available.

BIDS ASKED

FIRE HOSE — **Fresno, Calif.** — City Comn. taking bids about 5,000 ft. fire hose.

FIRE TRUCK CHASSIS—Oakland, Calif.—W. L. Chappell, city clk., taking bids furnishing gasoline-propelled truck chassis for Fire Dpt.

FUEL OIL, etc.—Hartford, Conn.—June 9, by Bd. Contr. & Supply, fuel oil tanks and pumps for several municipal departments.

DOUGLAS FIR, etc.—Glenwood, Ia.—June 10, by Mills Co., E. A. Schade, aud., 16,667 ft. B.M. creosoted Douglas fir or yellow pine lumber: 36,000 ft. B.M. Class D, 28,000 ft. B.M. Class A Douglas fir lumber; 10,667 ft. B.M. Class C fir lumber; 2,325 lin.ft. creosoted yellow pine piling. Bids May 19 rejected. T. R. Martin, co. engr.

FIR LUMBER—Manchester, Ia.—June 9, by Delaware Co., R. Welterlen, aud., 3 carloads of Douglass fir lumber. H. S. Klaus, co. engr.

ROAD OIL, etc.—Crookston, Minn.—June 9, by B. M. Loken, city clk., 28,000 gal. road oil, 8,000 gal. cutback asphalt, RC-2, f.o.b. tank cars.

TRUCK—Worthington, Minn.—June 9, by W. C. Thom, aud. Nobles Co., one 1½ ton truck, one panel delivery, 2 motor graders. H. R. Bray, co. hy. engr.

†TRUCKS—Vicksburg, Miss.—June 10, by U. S. Eng., Vicksburg, 3 new canopy type trucks with inclosed cab.

†LUMBER—Omaha, Neb.—June 9, by U. S. Eng., 819 City Natl. Bank Bldg., 2,000,000 bd. ft. 1x4 in. mattress lumber. $60,000.

†WOOD PILES—Omaha, Neb.—June 9, by U. S. Eng., Omaha, 10,000 round wood piles from 24- to 68 ft. long. $50,000.

†Federal Government

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Materials, etc. (Continued)

†SPHERE VALVES—**Boulder Dam, Nev.**—June 15, by Pub. Rds., Denver, Colo., furnishing five 30 in. sphere valves for installation in power house penstocks for Boulder Dam Power House. R. E. Walter, Denver, ch. engr.

†WIRE—**Brooklyn, N. Y.**—June 9, by Signal Corp. Procurement Dist., Army Base, 58th St. and 1st Ave., furnishing wire.

SHOP EQUIPMENT—**Jamaica, N. Y.**—June 16, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing, installing shop equipment for City-owned Rapid Transit Railroad, Jamaica Yard, Contr. Y-85.

TANKS, etc.—**Johnstown, N. Y.**—Sinclair Refining Co., 10 West 51st St., New York, G. P. Foster, in charge, taking bids tanks and equipment for gasoline service station. To exceed $1,000.

TANKS—**Seneca Falls, N. Y.**—Standard Oil Co. of New York, H. M. Graves, in charge, Genesee Bldg., Buffalo, taking bids 500 gal. storage tanks for service station, Fall and Rumsey Sts. To exceed $1,000.

DIESEL ENGINE—**Fremont, N. C.**—Town in market for Diesel engine. $55,000. Application filed with P.W.A. for funds.

GRADER—**Crosby, N. D.**—June 9, by M. Skabo, aud. Divide Co., one hand controlled blade grader with 12 ft. blade.

STEAM ENGINE—**Canton, O.**—C. C. Kelhofner, Route 5, in market for 16 hp. steam engine, horizontal boiler and other equipment. $1,000.

COAL TIPPLE MACHINERY—**Johnstown, Pa.**—Carnegie-Illinois Steel Corp., Pittsburgh, in market for coal tipple machinery, incl. transmission and conveying equipment to replace equipment destroyed by fire at Tipple No. 5, Lorain Division.

TRANSMISSION EQUIPMENT, etc.—**Youngsville, Pa.**—C. Peters, Youngsville, in market for transmission, conveying equipment and machinery and equipment for flour and feed mill, now nearing completion.

CONVEYOR—**Milwaukee, Wis.**—June 18, by Sewerage Comn., furnishing, erecting pneumatic conveyor for handling chaff. J. L. Ferebee, Milwaukee, ch. engr.

METERS—**Milwaukee, Wis.**—June 16, by Dpt. P. Wks., furnishing, installing venturi meters, gages for water purification plant. R. E. Stoelting, comr.

FIRE TRUCK—**Oconto Falls, Wis.**—June 25, by Village, furnishing fire truck.

MOTORS—**Midland, Ont.**—M. J. Bray, Midland Wood Products Ltd., in market for one 3 hp., two 5 hp., two 10 hp., two 2 hp. and two 1 hp. motors all three phase, 60 cycle, 220 volts with starter and no volt release. Would consider good second hand motors.

TANKS, etc.—**Montmagny, Que.**—June 12, by British America Oil Co. Ltd., Canardiere Rd., Quebec City, in market for two 1,000 gal. steel tanks and 2 double pumps. To exceed $1,000.

TANKS and PUMPS—**Quebec City, Que.**—J. A. Roy, Charest Blvd., in market for two 1,000 gal. gasoline tanks and 2 double pumps. To exceed $1,000.

CONTRACTS AWARDED

CAST IRON PIPE—**Alhambra, Calif.**—City Clerk, 9,000 ft. 6 in. and 3,000 ft. 8 in. cement-lined Class 250, c.i. pipe for replacements, to U. S. Pipe & Fdry. Co., 417 South Hill St., Los Angeles, $11,535. Bids May 19, awarded May 21. Noted May 28, C.D.

MOTOR TRUCK—**Jackson, Calif.**—L. M. Huberty, clk. Amador Co., furnishing one 2 ton truck, 151 in. wheel base, to Oneto Bros., Sutter Creek, $1,653. Bids May 4, awarded May 17. Noted Apr. 28, C.D.

†DIESEL ENGINE—**Livermore, Calif.**—Veterans Administration Facility, Livermore, Diesel engine for Veterans Hospital, to Enterprise Engine Corp., 2902 19th St., San Francisco, $4,250. Awarded May 18.

MOTOR GENERATOR CHARGING SETS—**Los Angeles, Calif.**—S. A. Joseph, purch. agt., Metropolitan Water Dist., 306 West 3rd St., furnishing 2 motor generator charging sets, complete with control, Spec. E-250, for Colorado River Aqueduct, Bid 59320, to Westinghouse Electric & Mfg. Co., 420 South San Pedro St., $6,000. Bids May 21, awarded May 25.

PULLEYS, etc.—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing Allis-Chalmers Type "V" pulleys in such quantities as may be required during period of 12 months from date of contract, Spec. 1935, discount from manufacturer's published price lists, pressed steel and iron "V" pulleys, to H. Ledeen, 747 Warehouse St., $27,500; steel, cast steel and die cast "V" pulleys, to Goddard Jackson Co., 1400 Santa Fe Ave., $7,500. Bids Apr. 20, awarded May 19. Noted Apr. 15, C. D.

WATER PIPE—**Oakland, Calif.**—J. H. Kimball, secy., East Bay Municipal Utility Dist., 512 16th St., 5,000 ft. 8 in. asbestos cement water pipe, to Johns-Manville Sales Co., 1605 Jefferson St., $4,990. Awarded May 15. Noted May 15, C. D.—May 7, E. N.-R.

OIL CIRCUIT BREAKERS—**Pasadena, Calif.**—City Clerk, furnishing 60 cycle, 3 pole, single throw solenoid operated outdoor type oil circuit breakers, 6 rated 600 amp., 34,500 volt, 750,000 kva. interrupting capacity, four rated 600 amp., 46,000 volt, 1,000,000 kva. interrupting capacity, for Maryland and Boulder Power Substations, to Kelman Electric & Mfg. Co., 1650 Naud St., Los Angeles, $39,832. Bids May 11, awarded May 19. Noted May 20, C.D.

PIPE — **San Bernardino, Calif.** — Bd. Water Comrs., City Water Dpt., 5,000 ft. 4 in. Class 250 B and S c.i. water pipe, Spec. WW-P-241, to National Cast Iron Pipe Co., 625 South Western Ave., Los Angeles, $2,640. Bids May 18, awarded May 18. Noted May 15, C. D.

CAST IRON PIPE—**Santa Monica, Calif.**—City Clerk, furnishing 3,000 ft. 6 in. and 490 ft. 4 in. Class 250 c.i. pipe, to American Cast Iron Pipe Co., 412 West 6th St., Los Angeles, $2,859. Bids May 18, awarded May 21.

†OUTLET PIPES — **Denver, Colo.** — Bureau Reclamation, Denver, Colo., welded plate-steel outlet pipes for installation in outlet works of Moon Lake and Taylor Park Dams, Spec. 781-D, Item 1, to Utah Welders, 133 East 4th St., Salt Lake City, Utah, $6,133; Item 2, to J. W. Beam, Guardian Trust Bldg., Denver, Colo., $10,800. Bids Apr. 13. Noted Mar. 31, C. D. —Apr. 9, E. N.-R.

†STEEL HULLS — **Denver, Colo.** — Bureau Reclamation, Denver, welded steel hulls for pump barges, to Columbian Steel Tank Co., South Andrews and South Normal Sts., Chicago, Ill., $4,764***structural steel supports, Item 1, to Hansell Elcock Co., South Andrews and South Normal Sts., Chicago, Ill., $16,000*** Item 2, to Blaw Knox Co., Blawnox Bldg., Pittsburgh, Pa., $13,383***Item 3, to Crane-O'Fallon, 1631 15th St., $6,357. Grand total $40,504.

EMULSIFIED ASPHALT—**Hartford, Conn.**—Bd. Contr. & Supply, at office of Mayor, 100,000 gal. emulsified asphalt, to Webb Asphalt Paving Corp., 69 Middletown Ave., New Haven, $5,994. Bids May 28. Noted Apr. 20, C. D. —Apr. 23, E. N.-R.

TRAILER—**Hartford, Conn.**—Bd. Contr. & Supply, at office of Mayor, furnishing, delivering one 15 ton trailer for hauling road machinery for Street Dpt., to K. B. Noble Co., 249 Pearl St., $1,850. Bids May 12. Noted Apr. 29, C. D.—May 7, E. N.-R.

ARCH CASTINGS, etc.—**Chicago, Ill.**—City, City Hall, 6,000 cast iron arch castings, to Mueller Co., 205 West Wacker St., 19.2c. each; and 50,000 lb. plumber's solder, to Eagle Picher Sales Co., 4401 South Western Ave., 20.83c. per lb.

FINE AGGREGATE, etc.—**Urbana, Ill.**—Champaign Co., to Neal Gravel Co., Mattoon, 170 tons fine aggregate at $1.30 per ton; 270 tons coarse aggregate $1.45 per ton***to Concrete Steel Co., 3109 South Central Park Ave., Chicago, 28,880 lb. reinforcing bars $2.401 per cwt.; 41,115 lb. reinforcing bars $2.2141; 66,940 lb. reinforcing bars $2.3015 per cwt.***to Calumet Steel Co., 20 North Wacker Dr., Chicago, 1 name plate $3.90; 10 floor drains $1.65 each; 2 name plates at $3.90; 1 name plate $3.90; 20 floor drains $1.85 each; 29,190 lb. reinforcing bars 2.5c.***to Interstate Sand & Gravel Co., Terre Haute, Ind., 350 tons fine aggregate at $1 per ton***to Standard Materials Corp., Indianapolis, Ind., 555 tons coarse aggregate $1.26 per ton***to Material & Fuel Co., Danville, 250 tons fine aggregate $1.18 per ton ***to Ludlow Elevator Co., Ludlow, 375 bbl. portland cement in cloth sacks $2.63 per bbl. f.o.b. and $2.88 per bbl. f.o.b. job site***to Lincoln Sand & Gravel Co., Lincoln, 170 tons fine aggregate $1.33 per ton***to Lehigh Stone Co., Kankakee, 270 tons coarse aggregate $1.55 per ton. Bids May 15. Noted May 14, C. D.

AIR COMPRESSOR—**New Bedford, Mass.**—City, Water Bd., Municipal Bldg., 1 air compressor with Mass. standard tank, to Babbitt Steam Specialty Co., 55 South Water St., New Bedford, $2,075. Awarded May 13.

GRADER, GASOLINE, etc.—**Meridian, Miss.**—Bd. Supervs. Lauderdale Co., one Adams leaning wheel grader and one McCormick Deering trailer, to Mississippi Road & Supply Co., Jackson, $2,198 and $3,975 respectively***six months' supply of culverts, to eight contractors ***gravel, to Waters & McCrary Gravel Co., Columbus Gravel Co. and Southern Sand & Gravel Co., Columbus***6 months' supply road building slag, to Woodstock Slag Corp., 2201 First Ave. N., Birmingham, Ala. Total est. $10,000. Noted May 5, C. D.

†ROUND WOOD PILES—**Kansas City, Mo.**—U. S. Eng., 232 Mfg. Exch. Bldg., 5,000 round wood piles for Missouri River work, to Robinson Sales Corp., Canal Bank Bldg., New Orleans, La., $25,948. Est. $25,000. Bids May 14, awarded May 20. Noted May 8, C. D.

STEEL RAILS—**Kansas City, Mo.**—Kansas City Council Ry., A. N. Reece, ch. engr., 11th and Wyandotte Sts., 3,000 tons steel rail, to Carnegie-Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa., about $100,000; 1,000 tons, to Inland Steel Co., 38 South Dearborn St., Chicago, Ill., about $34,000. Track work in Oklahoma, Arkansas, Texas and Missouri, by day labor and separate contracts.

†CEDAR SIDING, etc.—**St. Louis, Mo.**—Dpt. Agriculture, Forest Service, 719 U. S. Court House and Custom House, 12th and Market Sts., 37 squares of Oregon or Washington cedar siding at Winona, to A. P. Crow, Ironton, $176 ***lumber for use in camp at Fredericktown, to Fredericktown Lumber Co., Fredericktown, $900***28 cu.yd. sand, 46 cu.yd. aggregate and 230 cu.yd. gravel for use at Fredericktown, to J. Owens, Fredericktown***44 cu.yd. granite cut rock, to A. J. Fox, Fredericktown. Bids Apr. 17.

†TOWERS—**Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., furnishing 4 diverter towers and 2 capacitor supports for Boulder Dam Power House Switchyard, to International Derrick & Equipment Co., Torrance, $17,002. Bids Mar. 30. Noted Mar. 20, C. D.

ROAD MATERIALS—**New Brunswick, N. J.**—City Comn., 500 tons coldprovia, to Utility Constr. Co., New Brunswick, $8.85 per ton; 100 tons rockite, to Kingston Bituminous Products Co., Kingston, $5.40 per ton.

ASPHALTIC ROAD OIL—**West Long Branch, N. J.**—Council, 19,500 gal. California asphaltic road oil, to Tar Asphalt Service, Inc., New Brunswick, $1,658. Bids May 20.

STORAGE TANK, etc.—**Buffalo, N. Y.**—Buffalo Lamp Wks., 1495 Fillmore Ave., Buffalo, constructing 45 ft. diam. steel storage tank, 46 ft. high for illuminating gas, own forces. To exceed $1,000. Structural steel, to Chicago Bridge & Iron Wks., 654 Rockefeller Bldg., Cleveland, O. Owner buys materials. C. L. Lenz, in charge.

TRUCK—**Irvington, N. Y.**—Bd. Town Trustees, 4 ton truck for Sanitary Dpt., to J. Martinson, Irvington, $3,665.

PORTLAND CEMENT—**Manlius, N. Y.**—Bd. Supervs. Onondaga Co., Court House, Syracuse, 7,600 bbl. portland cement for Manlius-Pompey Center Hy., to Alpha Portland Cement Co., Jamesville, $20,368.

FINE AGGREGATE—**Raleigh, N. C.**—City, 1,200 tons fine aggregate, to F. D. Cline, Raleigh, $7,320. Bids May 20.

FIRE TRUCK—**Raleigh, N. C.**—City, 1 triple combination fire truck and pumper, to American La France Co., 100 East La France St., Elmira, N. Y. Bids May 11, awarded May 22. Noted May 1, C. D.

TYPE TRACTOR—**Dickinson, N. D.**—Mr. F. Lenhart aud. Stark Co., crawler-type tractor, to Dakota Tractor & Equipment Co., Fargo, $4,915. Bids May 12. Noted May 6, C. D.

BITUMINOUS MATERIAL—**Harrisburg, Pa.**—Commonwealth of Pennsylvania, furnishing bituminous material, 660 tons, to J. M. Doyle Co., 1519 Sansome St., Phila., $3,193***100 tons, to K. L. Dunbar, South Dock and Oyster Ave., Sharon, $563***250 tons, to Baldwin Bros. Paving Co., Union Trust Bldg., Cleveland, O., $1,378. Grand total $5,133.

WASHED SAND and GRAVEL, etc.—**Kingston, Pa.**—Borough, Borough Hall, to F. B. Szarlat, Kingston, furnishing washed sand and gravel, $1.35 per ton, delivered; crushed stone $1.55 per ton, delivered***to Westside Building Material Co., Kingston, portland cement, 68c. per cloth sack; common clay brick at $17.50 per thousand delivered***to Central Clay Products Co., Wilkes-Barre, paving brick at $55 per thousand delivered; vitrified clay pipe as follows: 8 in. at 23.1c. per ft., 10 in. 34.65c. per ft.; 12 in. 44.55c. per ft.; 15 in. 72c. per ft.; 18 in. $1.075 per ft.; 20 in. $1.29 per ft.; 24 in. $1.935 per ft.; 8x6 wyes at 92.4c. each; 20x12 tees $5.16 each; 24x12 tees, $7.74 each ***to Gates Fdry. Co., Wilkes-Barre, manhole and inlet castings, 24 in. manhole covers and frames, $9.25***to H. B. Sproul, Wilkes-Barre, Type C-2 bituminous materials, 6.83c. per gal. ***to C. F. Goeringer Constr. Co., 296 Madison St., Wilkes-Barre, Type E-1 bituminous materials at 6c. per gal.; asphalt paving materials $5.65 per ton***to Maloney Oil Co., Wilkes-Barre, bituminous materials, Type B.F.-1, at 11.5c. per gal.; Type D.H.-3, 15c. per gal. Above to be supplied as required by Borough, until Jan. 1937. Bids May 4.

FIRE HOSE—**Wilkes-Barre, Pa.**—City, H. Weiss, clk., City Hall, 4,100 ft. fire hose, to D. L. Gothie, Westlawn, at 72c. per ft. Est. $3,500. Awarded May 23.

†CARRIER CURRENT RELAY SYSTEMS, etc.—**Knoxville, Tenn.** — Tennessee Valley Authority, Knoxville, carrier current relay and telephone systems for Wilson, Wheeler and Norris Power plants, to General Electric Co., River Rd., Schenectady, N. Y., $115,194*** 80,000 cu.yd. cofferdam fill, to American Aggregate Corp., Greenville, O., 30c. per cu.yd. ***generator, neutral cubicle type switchgear for Norris and Wheeler power plants, to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., $15,294***aluminum sash for Norris Dam and elevator penthouse, to Kawneer Co., Niles, Mich., $12,300***metal doors, to Superior Steel Door & Trim Co., 115-15 14th Rd., College Point, N. Y., $7,818. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

SLUDGE COLLECTOR EQUIPMENT—**Maryville, Tenn.**—Bd. City Comrs. at office of J. J. Walker, recdr., furnishing sludge collector equipment for 2 sedimentation tanks in sewage disposal plant, to Link-Belt Co., 2045 Harding Park Ave., Phila., Pa., $2,245. Construction of plant proper is being done by force account. Bids Mar. 18, awarded Mar. 18. Noted Mar. 5, C. D.

†CEMENT, etc.—**San Antonio, Tex.**—Treas. Dpt. Procurement Officer, Smith-Young Tower, soon takes bids furnishing 200 bbl. cement, f.o.b. Sequin; nails f.o.b. Galveston; 20,000 ft. creosoted treated lumber f.o.b. Farnell; 50 bbl. cement f.o.b. Newton; finishing hardware f.o.b. Kirbyville; dynamite, caps, fuses, etc. f.o.b. McKinney; 120 bbl. cement f.o.b. Marfa; 19,000 ft. lumber, 600 lb. wire nails, f.o.b. Nachogdoches; turpentine, zinc, paint, etc. f.o.b. Kirbyville; 225 pcs. reinforcing steel f.o.b. Newton; 80 tons stone dust in paper bags f.o.b. Dallas; 31 tons stone dust for Fitzhugh Ave.,

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†*Federal Government*

Materials, etc. (Continued)

f.o.b. Dallas; electric lighting plant f.o.b. Pear Valley; switches, outlet boxes, switchplates, connectors, panel boards, friction and rubber tape f.o.b. Water Valley. W.P.A. projects.

PIPE, etc.—Seattle, Wash.—King Co. Water Dist. 3, Empire Bldg., furnishing 4,360 ft. 8 in., 4,280 ft. 6 in. and 4,760 ft. 4 in. c.i. pipe, five 8 in., seven 6 in. and six 4 in. gate valves, 18 c.i. valve boxes, 25 tees, 7 crosses, two 4x4 ells, 17 four in. hydrants, two 4 in. pressure reducing valves, to H. G. Purcell Co., Colman Bldg., $11,245. Noted Apr. 15, C. D.—Apr. 23, E. N.-R.

VALVES—Seattle, Wash.—City Water Dpt., County-City Bldg., furnishing one 24 in. and two 16 in. cone valves, to Golden-Anderson Valves Specialty Co., Pacific Bldg., Portland, Ore., $3,750. Bids May 11, awarded May 21.

PIPE — Spokane, Wash. — City Water Dpt., City Hall, furnishing 3,000 ft. 6 in. c.i. water pipe, to Hughes & Co., South 119 Howard St., $2,340. Noted May 22, C. D.—May 28, E. N.-R.

TRANSFORMERS, etc. — Tacoma, Wash. — City Light Dpt., City Hall, furnishing transformers, to Home Electric Co., 1316 A St., $25,000; 3,000 suspension insulators, in strings of three, 1,000 strain insulators, strings of four, use on 52 kv. transmission line, to Graybar Electric Co., 1214 A St., $6,720. Bids May 11, awarded May 20. Noted May 1, C. D.

GRADERS—Appleton, Wis.—Outgamie Co., furnishing graders, to Brebner-Sinz Mchy. Co., Inc., Green Bay, $4,967; and to Austin Western Rd. Mchy. Co., Aurora, Ill., $4,926. Noted Mar. 31, C. D.—Apr. 9, E. N.-R.

GRAVEL—Granville, Wis.—Town, furnishing 4,000 cu.yd. gravel, to E. Lutz Sand & Gravel Co., Pt. Washington Rd., to J. Kleist Sand & Gravel Co., Green Bay Rd., and to J. Gough, 1512 North Van Buren St., at 70c. per cu.yd. Bids May 4, awarded May 19.

GRADER — Lake, Wis. — Town, furnishing motor grader with snow plow, to Wehr Co., Halthoff Pl., Cudahy, $4,820. Bids May 5, awarded May 19.

†**CYPRESS PILING—Milwaukee, Wis.**—U. S. Eng., 2,500 ft. cypress piling, to Collins Timber Co., 1218 Olive St., St. Louis, Mo., $730; crankshaft for pump engine, to W. Leward Co., New Briton, Pa., $682; 15,800 lb. manila rope, to Rinek Cordage Co., 800 Bushkill Dr., Easton, Pa., $2,009. Grand total $3,421.

†**REVOLVING SCRAPERS, etc.—Milwaukee, Wis.**—U. S. Forest Service, 12 revolving scrapers, to Austin Western Road Mchy. Co., 404 North Michigan Ave., Chicago, Ill., $1,222; explosives, to Atlas Powder Co., Wilmington, Del., $4,595; brushes, to David Linzer & Sons, Inc., 10 Astor Pl., New York, $805. Grand total $6,623. Bids May 12, awarded May 23.

†**SAND and GRAVEL SCREEN—Milwaukee, Wis.**—U. S. Eng., furnishing sand and gravel screen, to Lippmann Eng. Wks., 4603 West Mitchell St., $1,465. Bids May 22, awarded May 23.

STEEL RODS — Milwaukee, Wis. — City, furnishing steel rods and reinf. plates, to C. Hennecke, 3225 North Pierce St., $1,626; reinf. plates and angles, to Milwaukee Bridge Co., 3282 North 34th St. $720.

†**WIRE ROPE, etc.—Milwaukee, Wis.**—U. S. Eng., 36,766 ft. wire rope, to Union Wire Rope Corp., 5 North Madison Ave., Tulsa, Okla., $9,759; steel pile shoes, to A. J. O'Leary & Sons, 5757 West 65th St., Chicago, Ill., $36. Bids May 12. Noted May 6, C. D.

CEDAR POLES — Oconomowoc, Wis. — City, furnishing 40-30 ft. and 60-40 ft. western red cedar poles, to Milwaukee Cedar Co., 101 West Becher St., Milwaukee, $1,000. Bids May 18.

PUMP—Edmonton, Alta.—Municipality supplying low lift pump, to Gormans Ltd., Edmonton, $4,802.

WATER METERS—Hamilton, Ont.—W. L. McFaul, city engr., City Hall, supplying 1,280 water meters, to Neptune Natl. Meters Ltd., 345 Sarauren Ave., Toronto, $15,561. Noted May 5, C. D.

GRADER — Lindsay, Ont. — H. D. Wilford, engr. Victoria Co., motor grader for county road use, to General Supply Co. of Canada, 347 Sorauren Ave., Toronto. Est. $3,500. Noted Apr. 16, C. D.

TANKS—London, Ont.—Shell Oil Co. moving storage tanks from East London to Burwell St., at London and Port Stanley Ry. Owner builds. Est. $25,000. Noted Mar. 5, C.D.—Mar. 12, E.N.-R.

GRAVEL—Pilkington Twp., Ont.—Pilkington Twp., M. L. Auger, supt. R.R. 1, Elora, supply, crushing and hauling 5,000 yd. or more of gravel, to John Murray, Moorefield, at 46c. per yd.

MOTOR and PUMP—Preston, Ont.—Town, motor and pump for pumping station, to English Electric Co. of Canada Ltd., George St., St. Catherine, $859; 700 gal. pump, to Babcock-Wilcox & Goldie-McCulloch Ltd., 64 Grand St. S., Galt, $706.

FOREIGN

Australia, Melbourne — June 17, by States River & Water Supply Comn., supplying motor driven centrifugal pumping unit, starting gear, switchboard and necessary cables and connections.

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China—Ministry of Industry, **Shanghai**, preparing plans constructing plant to manufacture dynamos, laboratory equipment, printing machinery, pumps and tubes, $2,470,000 voted; Ministry of Industry, **Wenchow**, preparing plans constructing newsprint plant, $19,500,000 voted.

Egypt, Cairo—Dpt. Finance interested in prices of new and second hand rails and angle irons; Dpt. Interior interested in prices of c.i. pipe 100 mm and 150 mm, also steel specials and fittings.

England — Manchester Municipality votes $496,600 for air raid shelter; May 28, by H. E. Dennis, town clk., **Poplar**, constructing municipal offices and town hall, Culpin & Son, 3 Portsmouth St., Lincoln's Inn, London, archts.; G. Grey Wornum, 39 Devonshire St., **London**, listing names of intending bidders for erecting large central highways depot and garage at Gatoff Rd., for Westminster City Council; T. Compton & Son, **Ashton**, preparing plans mill extension $550,000; South Durham Steel & Iron Co. Ltd., **Hartlepool**, preparing plans constructing battery of compound type high silica coke ovens of 7,500 tons capacity $5,000,000; British Loraine Aircraft Corp. **Stoneleigh**, purchased 10 acre site for plant for manufacturing aircraft $610,000; **Barrow** Borough Council constructing 292 houses at Roosegate, to Nicholson & Wright Ltd., Lancaster, $547,500; British Milanese Ltd., Wadsworth Rd., **Perivale**, plans by R. Seifert, 5 Broad St. Pl., London, for factory $600,000; **Halifax** Municipal Engineer in market for battery charging motor generator, switchgear and battery switchboard; **Leicester** Municipality housing construction, to Simmons Sons & Cook Ltd., Nottingham, $560,000; Universal City Co. Ltd., **Beconstree**, preparing plans factory on Oxlow Lane, $600,000; Cooke, Wilson Mitchell & Vaughn, engrs., Westminster, London, preparing plans airport at Langston Harbor, **Portsmouth**, $500,000; **Manchester** Municipality voted $711,870 for 244 houses at mills platting, tenders in June; Jessop Hospital for Women, **Sheffield**, making plans new maternity block $660,000; Richmond & South Middlesex Isolation Hospital Bd., **Richmond**, plans by P. J. B. Harland, 13 Manchester Sq. W., London, additions $750,000; **Newark-on-Trenton** Municipality in market for 150 kva. transformer and steel switching and transfer kiosk; R. Jenkins & Co. Ltd., **Rotherham**, making plans constructing boiler factory $600,000; Balsover Colliery Co. Ltd., **Balsover**, prepares plans plant for producing smokeless fuel, oils and gasoline, incl. 288 retorts and necessary subsidiary machinery $1,000,000; Sept. 14, by S. A. Jewers, town clk., **Barking**, competitive plans for new town hall $800,000; **Dagenham** Urban District Council, municipal building, to Allen Fairhead & Sons Ltd., Sydney Rd., Enfield, $554,825, E. B. Webber, Garden Square West, London; G. Fraser, archt., on behalf of Fifth Kings Liverpool Regiment, **Liverpool**, headquarters building, to John Lewis & Sons Ltd., Liverpool, $750,000; **Liverpool** Municipality, library building, Ashton St., to Joshua Henshaw & Son Ltd., Chatham Pl., Liverpool, $500,000, Willink & Dod, Cunard Bldg., Liverpool, archts.; **Leeds** Municipality, housing on Gipton Estate, to M. B. Bell Ltd., Leeds, $1,070,867; to Wooley Constr. Co. Ltd., Leeds, $1,460,280; and to W. J. Simms Sons & Cook Ltd., Nottingham, $662,850; National Smelting Co. Ltd., Saint Arden Rd., Avonville, making plans new works, **Shirehampton**, $1,000,000.

England — Nathan Cohen & Son Ltd., 10 Aberfeldy St. East, **London**, purchased 8 acre site at Barking for factory $550,000; London Public Transportation Bd., **London**, widening underground railway between Baker St. and Finchley Rd., to John Mowlen & Co. Ltd., Ebury Bridge Rd. S., London, $10,000,000, Mott, Hay & Anderson, Iddlesleigh House South, London, engrs.; Arsenal Football Club, **London**, new rein.-con. grandstand, to Wilson Lovatt & Sons Ltd., Wolverhampton, W. B. Binnie, Old Queen St. S., London, archt.; Technicolor Ltd., Victoria House, Southampton Rd. W., **London**, color film laboratory at Hammondsworth, to J. W. Mowlen Co. Ltd., Ebury Bridge Rd. W.; Imperial Chemical Industries Ltd., Millbank House South, **London**, plans new works $1,000,000; Governors of Great Northern Hospital, **London**, plans by Adams, Holden & Pearson, 9 Knightsbrige South, additional unit $1,750,000; Trustees of National Hospital for Diseases of Nervous Systems, **London**, plans by Slater & Moberley, 46 Bermer St. West, for addition $600,000; Governors of Free Cancer Hospital, Fullman Rd., **London**, vote $750,000 for remodeling hospital; Air Roads & Patents Ltd., 8 Henrietta St. W., **London**, prepares plans aircraft factory; Amalgamated Aircraft Builders Ltd., 7 Lawrence Country Hill E., **London**, plans plant $500,000; Austin Motor Co. Ltd., Birmingham, making plans aeroplane factory. **Cofton Hackett**, $1,500,000; **Plymouth** Municipality plans by Barrow & Rooke, 1 Sussex Terrace, Plymouth, 326 houses $752,000; F. Gibbon, 57 Ashford St., **Shelton**, preparing plans 383 houses $770,000; Drury & Co., 4 Market Pl., **Kettering**, plans 386 houses $792,000; **Huddersfield** Municipality plans by T. Worthington & Sons, 178 Oxford St., Manchester, hospital addition $550,000; Surtees Auto Marine Aircraft Ltd., Pakefield, plans factory for manufacturing auto, marine and aircraft products, **Lowestoft**; Batchelor & Co. preparing plans food canning and packing plant, **Sheffield**, $550,000; The River Trent Catchment Bd., **Sheffield**, plans land drainage system $11,182,500; **Leeds** City Clerk, receiving competitive plans swimming pool $380,000; **Liverpool** Municipality donated land and plans erecting hospital $2,500,000.

England, London—Postmaster General, G. C. Tryon, London, would be glad to ascertain offers for telegraph poles.

Germany, Cologne—German Ford Motor Co., Cologne, Germany, and Dearborn, Mich., plans acquisition of Stoever Works and alterations same for automobile body manufacturing plant. To exceed $40,000. **Maturity later.**

Greece, Athens—Aug. 1, by Chairman Abattoir Committee, constructing abbatoir. $900,000.

Irish Free State—T. Thompson & Sons, Carlew, will construct asbestos factory, Athy, machinery requirements alone $150,000; **Dublin** Municipality in conjunction with department of Industry & Commerce plans hydro-electric development at Poulaphuca and River Liffey, $10,000,000.

Mexico, Mexico City—Mexican Government, L. Cardenas, pres., plans constructing public school buildings on Rio Grande Border, adjoining United States. Federal Eng. Branch, engrs., and Federal Architectural Dpt. P. Buildings, archts., both Mexico City.

New Zealand, Wellington — Secretary Public Wks., Supplies & Tenders Bd., interested in prices portable air compressors.

Northern Ireland, Belfast—Harland & Wolff Ltd., making plans constructing aircraft manufacturing plant, $650,000; J. and R. W. Tagert Co. making plans 202 houses construction at Ballysillan, $560,000.

Norway, Oslo — Government preparing plans hydro-electric extension at Skorum and Sorge, $500,000.

Peru, Callao — Peruvian Government, Lima, constructing 550 ft. graving dock, to Frederick Snare Corp., 114 Liberty St., New York, N. Y., $1,365,000. F. R. Harris (U.S.N. retired), c/o owner, engr. Contractors will purchase machinery, steel, reinforcing rods, etc. in United States.

Peru, Lima—Ferrand H. Nas, S. A. Ltda, Cassilla 546, in market for piping and tubing, lead and iron, house.

Scotland—National Bank of Scotland, Saint Enochs Sq., **Glasgow**, plans by Watson, Salmond & Gray, 246 West George St., remodeling and constructing addition $750,000; **Falkirk** Municipality making plans 700 houses $1,220,000; British Linen Co. Ltd., Gallowgate, plans by J. Fairweather, The Irongate, Argyle St., reconstructing and bank building addition, **Glasgow**, $700,000; **Greenock** Municipality plans by D. and L. Henderson, 5 The Vennell Vulcan Sq., Greenock, for asylum and hospital at Smethston, $650,000; Babcock & Wilcox Ltd., Porterfield, plans steel manufacturing plant and foundry, **Renfrew**, $600,000; **Aberdeen** Municipality making plans for high school for girls, $565,000 voted.

Scotland, Aberdeen—Stewart & Co., Fraser Rd., in market for one 10 ton, one 15 ton and one 20 ton all steel steam derrick cranes.

South Africa—Union Government, **Pretoria**, 3,500 ton dredger, low well suction type, carrying spoil in hold, steam driven, to Lobnitz & Co. Ltd., Renfrew, Scotland, $500,000; T. H. Watermeyer, genl. mgr., South African Ry. and Harbors Administration, **Johannesburg**, in market for thirteen 4 ton electric cranes for Durban Harbor; D. D. Watson of African Cables Ltd., **Vereeniging**, preparing plans factory $800,000; **Port Elizabeth** Municipality making plans water supply improvements, incl. main replacements and new reservoir $850,000, also tenders in June, development at Kromme River $4,500,000; **Johannesburg** Municipality in market for 400 tons grooved tramway rails; **Pretoria**, Union Tenders & Supply Bd., interested in prices of galvanized iron, telephone wire and pole fittings.

Tasmania, Burnie—A. G. Ogilvie announces early construction of pulp and paper plant, 15,000 tons initial capacity. $15,000,000.

Wales—Trading Estate, **Port Talbot**, making plans thermal electric generation plant, $1,250,000; Glanmorganshire Roads & Bridge Commission, **Pontardulais**, making plans ferro-concrete 40 ft. wide, single span bridge over Loughor River; **Abertillery** District Council making plans reconstructing 142 ft. Foundry Bridge; Carmarthenshire County Council, **Carmarthen**, making plans bridge over River Towy, $487,605.

Wales, Whitechurch — Glanmorgan County Education Council making plans senior and secondary schools. $1,425,000.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Anaheim—Anaheim Elementary School Dist., plans by Marsh, Smith & Powell, 816 West 5th St., school buildings. $270,000. Election June 9 to vote bonds for same. Noted May 21, C.D.—May 28, E.N.-R.

Calif., Georgetown—City, c/o Secretary, election June 23, $60,000 bonds for power plant improvements. P.W.A. project. Burns & McDonnell, 107 Linwood Blvd., Kansas City, Mo., engrs. Noted May 28, C. D.—Apr. 9, E. N.-R.

★ †**Calif., Los Angeles**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post office. $2,600,000.

Calif., Palo Alto—Palo Alto School Dist. voted bonds May 14, to finance construction 2 story, rein.-con. Junior High School, administrative offices, boys and girls gymnasium, auditorium, cafeteria, and library. $360,000. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

†*Federal Government*

Public Buildings (Continued)

Ga., Gainesville—City, c/o W. A. Palmour, Jr., mayor, preliminary plans approved 1½ story, basement, brick, rein.-con. city hall, Daniell & Beutell, Georgia Savings Bank Bldg., Atlanta, archts.

Idaho, Pocatello—State Bd. Educ. plans constructing men's dormitory at Southern Branch of University of Idaho. $200,000. Architect not appointed.

Ill., Dixon—State Dpt. P. Wks. & Buildings, Div. Architecture & Eng., Springfield, plans by C. H. Hammond, Capitol Bldg., Springfield, female employees' dormitory.

★ **Kan., Kansas City**—City, City Hall, soon takes bids furnishing, placing new turbines and boilers for improving city owned power plant. $1,000,000. Burns & McDonnell, 107 West Linwood St., Kansas City, Mo., engrs. Noted Apr. 17, C. D.—Apr. 23, E. N.-R.

†**Ky., Louisville**—P. Wks. Administration, Housing Div., Wash., D. C., postponed bids to have been opened May 28, constructing superstructures for LaSalle Place Housing Project. Noted Apr. 20, C. D.—Apr. 23, E. N.-R.

Md., Baltimore—Municipality bids early in June art museum addition. $150,000 or more. John Russell Pope, 542 5th Ave., New York, archt.

Md., Salisbury—School Comrs. Wicomico Co., Court House, plans by Malone & Williams, Salisbury, 2 story, basement, new Pinehurst Elementary School, $110,000; 2 story, basement, elementary school building, $40,000, both Salisbury; 2 story, basement, elementary school building, Mardela, $70,000; plans by W. Booth, Salisbury, 2 story, basement, elementary school, Fruitland, $50,000; 2 story, basement, addition to present elementary school, Delmar, $50,000; 2 story, addition to colored industrial school, Salisbury, $30,000; 2 story, basement school, Chestnut and Ball Sts., $100,000. P.W.A. project. Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

Minn., Farmington—City plans survey to determine size of a municipal electric light and power plant, to serve community and estimated cost. To exceed $100,000. Buell & Winter Eng. Co., 503 Insurance Bldg., Sioux City, Ia., engrs.

Minn., Long Prairie—Village, R. E. Beach, recdr., survey ordered constructing municipal electric light and power plant. Burlingame & Hitchcock, 526 Sexton Bldg., Minneapolis, engrs.

Mo., Fulton—Bd. Educ. plans by Felt, Dunham & Kriehn, 4638 Mill Creek Bldg., Kansas City, constructing school. Election June 9 $142,000, bonds for same.

Mont., Great Falls—School Dist. 1, V. C. Gibbon, clk., defeated $165,000 bonds, remodeling and altering schools. Noted May 11, C. D. —May 14, E. N.-R.

N. J., Chatham—Bd. Educ. plans by W. A. Pieper, 332 Springfield Ave., Summit, 2 story, basement addition to School 2. $175,000. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

★ **N. J., East Orange**—Bd. Educ. plans by Guilbert & Betelle, 24 Branford Pl., Newark, new Junior High School, $840,000 plus.

★ **N. Y., Attica**—State Dpt. Correction, State Office Bldg., Albany, plans by W. E. Haugaard, State Office Bldg., Albany, constructing cell block and tunnels. $800,000. **Maturity 1937.** T. F. Farrell, Albany, state hy. engr.

N. Y., Beacon—Bd. Educ. soon takes bids constructing school. $225,000. Tooker & Marsh, 101 Park Ave., New York, archts. Noted Sept. 16, C. D.—Sept. 19, E. N.-R.

N. Y., Ogdensburg — Bd. Educ., rejected bids constructing Senior School. $400,000. P.W.A. project. Randall & Vedder, S. A. & K. Bldg., Syracuse, archts. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

★ **N. Y., Plattsburgh**—City, City Hall, voted to construct municipal light plant. $590,000. P.W.A. funds allotted. **Maturity in summer 1936.** Noted Oct. 18, C. D.—Oct. 24, E. N.-R.

★ †**N. Y., West Point**—Con. Q. M., U. S. Military Academy, West Point, constructing 19 double sets officers quarters, one 12 family apartment, two 5 row sets of quarters. $810,000.

†**N. Y., West Point**—Con. Q.M., U. S. Military Academy, rejected bids May 5, constructing high pressure steam boilers, and changes to power plant. $160,000. Will readvertise. Noted May 8, C.D.—Apr. 23, E.N.-R.

N. C., Chapel Hill—Town, J. M. Foushee, mayor, filed application for P.W.A. loan and grant to construct power plant. $243,635.

N. C. Goldsboro—State Hospital for Insane, Dr. W. C. Linville, pres., plans constructing heat line to large group of buildings across river from boiler house. $12,000.

N. C., Raeford—Bd. Comrs. Hoke Co., J. P. Ray, Route 2, Raeford, chn. Bd. filed application with P.W.A. for loan and grant to finance construction sanatorium near here. Est. $173,000

N. C., Washington—City, S. R. Fowle, Jr., mayor, filed application with P.W.A. for loan and grant to finance construction of power heating and plant. $154,545.

O., Bluffton — Bluffton Community Hospital plans by F. D. McLaughlin, Lima, hospital. $140,000. Owner may construct by W.P.A. relief labor. **Maturity soon.**

O., Cleveland—City and W.P.A. c/o A. C. Gray, purch. agt., plans by H. Kregelius, 517 City Hall, four buildings; Blossom Hill Farm, $300,000. W.P.A. project.

O., Columbus—See "Sewerage and Waste Disposal."

O., Wapakoneta—City soon takes bids for new steam plant. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs.

Okla., Bristow — Municipality plans electric light and power plant. $275,000. P.W.A. project. W. R. Holway, 302 East 18th St., Tulsa, engr. Noted Apr. 13, 1935, C. D.

★ **Okla., Tulsa**—Bd. Educ. voted $1,700,000 bonds for school buildings.

Pa., Ambridge—Borough, T. B. Gibson, mgr., Boro Bldg., starting survey for municipal electric light plant. P. F. Loftus, Oliver Bldg., Pittsburgh, survey engr. R. L. Nadeau, Borough Bldg., 10th and Merchant St., boro engr. Noted Aug. 1, 1934, C.D.—Aug. 9, 1934, E.N.-R.

†**Pa., Phila.**—P. Wks. Administration, Housing Div., Wash., D. C., postponed bids to have been opened May 22, for superstructures for Hill Creek Housing Project, Project H 3301. Noted Apr. 22, C. D.—Apr. 30, E. N.-R.

†**Pa., Wayne**—P. Wks. Administration, Div. Housing, Wash., D. C., postponed bids to have been opened May 20, superstructure for Highland Homes, Project H 9001. Noted May 18, C. D.—May 7, E. N.-R.

†**S. C., Charleston**—P. Wks. Administration, Housing Div., Wash., D. C., received no bids May 25, constructing superstructures of Meeting Street Manor and Cooper River Courts Housing Project H-8901. Noted Apr. 27, C.D. —Apr. 30, E. N.-R.

Tenn., Lebanon—Wilson Co. Bd. Educ., E. A. Carson, secy., voted $160,000 bonds for rein.-con., brick, stone high school. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

†**Tex., Kenedy**—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids May 15, constructing U. S. Post office. Will readvertise. Noted May 20, C. D.—Apr. 23, E. N.-R.

Tex., Lockhart—City report in progress new power plant and distribution system. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs. Noted Mar. 18, C.D.—Mar. 21, E.N.-R.

Tex., Pecos—Reeves Co., c/o Judge J. B. Norfolk, Pecos, plans in abeyance, pending new appropriations for 3 story, basement, semi-fireproof courthouse, plain found. $165,000. J. G. Becker, San Angelo, archt. Mathews & Kenan, Smith-Young Tower, San Antonio, engrs. Noted Feb. 5, C. D.—Feb. 13, E. N.-R.

Tex., San Antonio—Bd. Educ., c/o R. S. Menefee, pres., Matagorda and Lavaca Sts., taking bids Junior-Senior High School, 2 story, 60x140 ft., structural tile, stucco, rein.-con., plain found., 1514 Durango St. $125,000. P.W.A. project. Phelps & De Wees, Gunter Bldg., archts. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

†**Va., Norfolk**—Yards & Docks, Navy Dpt., Wash., D. C., soon takes bids constructing aircraft repair building, Naval Air Station, Naval Operating Base. To exceed $60,000.

†**W. Va., Richwood**—Treas. Dpt. at office Sup. Archt., Wash., D. C., withdrew bids to have been opened May 29, constructing U. S. Post Office. Noted May 6, C.D.—May 14, E.N.-R.

N. S., Wedgeport—Canadian National R.R., C. K. Howard, ch. engr., Yarmouth, prepares plans C. N. R. Hotel.

Ont., Kenora—Kenora Auditorium Ltd., making plans rein.-con. auditorium and apartment block, plain found. $120,000. Money appropriated.

Sask., Battleford—Provincial Govt. plans by W. Withers & Co., Regina, converting boilers and power plant to use natural gas in Battleford Mental Hospital.

BIDS ASKED

†**Ala., Tuscumbia**—June 23, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000; adv. E. N.-R., June 4. Noted Nov. 18, 1935, C. D.—Nov. 21, 1935.

†**Calif., Auburn**—July 2, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $75,000.

†**Calif., Livermore**—June 15, by Veterans Administration Facility, Livermore, altering Building 46, incl. excavation, carpentry, masonry, concrete, plastering, roofing, plumbing, heating and electrical work, at U. S. Veterans Hospital.

†**Calif., Santa Maria** — June 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $84,000.

†**Colo., Fort Lyons**—Vet. Bu., Arlington Bldg., Wash., D. C., bids about July 1, constructing ward building, recreation building and administration. $495,000.

†**D. C., Wash**—June 12 (extended date), by Treas. Dpt., at office Sup. Archt., Wash., D. C., constructing vault in Archives Building. Noted May 12, C. D.—May 14, E. N.-R.

Ga., Atlanta—June 17, by Regents University System, constructing auditorium for Georgia Tech. $204,000. P.W.A. project. Bush, Brown & Gailey, Georgia Tech., archts.

Ga., Gainesville—June 9, by Hall Co., c/o R. G. McConnell, chn. Bd. County Comrs., 2 story, basement, brick, rein.-con., structural steel county courthouse. $140,000. Daniell & Beutell Co., Georgia Savings Bank Bldg., Atlanta, archts. Noted May 11, C. D.—May 14, E. N.-R.

†**Ill., Chicago**—June 30, by P. Wks. Administration, Div. Housing, constructing superstructures for Trumbull Park Housing Project, Project H-1408.

★ †**Ill., Chicago**—June 23, by Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling U. S. Court House. $675,000.

†**Ill., Geneva**—June 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $84,000. Noted Feb. 4, C. D. —Feb. 6, E. N.-R.

†**Ill., Madison**—June 19, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000. Noted Feb. 10, C. D. —Feb. 13, E. N.-R.

†**Ill., Marshall**—June 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

†**Ill., Salem**—June 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $67,000.

Ill., Springfield—June 9, by Dpt. P. Wks. & Buildings, Div. Architecture & Eng., Centennial Bldg., constructing superstructure, bookstack equipment for archives building. P.W.A. project. C. H. Hammond, superv. archt.

†**Ill., Staunton**—June 19, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000. (**Correction**—Bid **date.**) Noted May 26, C. D.

†**Ind., Garrett**—June 19, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $62,000.

Ia., Villesca — June 24, by City, Villesca, power plant building, fuel oil tanks, water cooling system, 2 Diesel engineering units, accessories, switchboard, complete distribution system. $150,000. Burns & McDonell Eng. Co., 107 West Linwood St., Kansas City, Mo., engrs.

†**Ky., Lexington**—June 17 (extended date), by P. Wks. Administration, Interior Bldg., Wash., D. C., constructing Blue Grass Park and Aspendale Project, Project H-5103. Noted May 12, C. D.—May 14, E. N.-R.

†**Md., Upper Marlboro**—June 23, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000. Noted May 14, C. D.—Apr. 9, E. N.-R.

†**Mass., Boston**—June 17 (extended date), by P. Wks. Administration, Div. Housing, Wash., D. C., constructing superstructures for Old Harbor Village Housing Project H-3302. Noted May 25, C. D.—May 28, E. N.-R.

†**Mass., Boston**—June 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., miscellaneous repairs to U. S. Appraisers Stores.

†**Mass., Orleans**—June 8, by U. S. Coast Guard, constructing 1 story, 23x36 ft. and 11x 23 ft., frame boat house, rein.-con. founds., at U. S. Coast Guard Station.

Mich., Midland—June 12, by E. Brown, secy. Bd. Educ., 2 story, basement, 37 room, brick, steel, stone, rein.-con. school and separate heating plant. To exceed $140,000. R. V. Gay, St. Johns, archt. Noted July 13, C. D.—July 25, E. N.-R.

Minn., Willmar—June 9, by State, c/o Bd. Control, furnishing, installing new piping, alterations, equipment, repairs to stack, water softening equipment and electrical work at State Asylum. G. M. Orr & Co., 408 Baker Bldg., Minneapolis, engrs.

†**Mo., Fredericktown and Winona**—See "Contracts Awarded."

†**Neb., Omaha**—June 16, by P. Wks. Administration, Housing Div., Wash., D. C., constructing foundations for North Side Housing Project H-2001.

†**Nev., Lovelock**—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $75,000.

★ **N. Y., Brooklyn**—June 15, by Dpt. Hospitals, S. S. Goldwater, comr., 125 Worth St., New York, general construction, plumbing, heating, ventilating, electrical work for nurses' home and training school at Kings County Hospital. $1,730,000. LeRoy P. Ward, Inc., 509 Madison Ave., New York, archts.

†**N. Y., Brooklyn**—June 23, by Treas. Dpt. at office Sup. Archt., Wash., D. C., repairing U. S. Post Office and Court House.

N. Y., Buffalo—June 11, by City, J. J. Summers, comr. P. Wks., City Hall, for materials and later for repairs and maintenance of all city-owned elevators in public buildings.

N. Y., Jamestown—June 8, by City, City Hall, general contract, heating, plumbing, electrical work for maternity and clinic hospital, Jones Ave. P.W.A. project. Beck & Tinkham, Bailey Bldg., archts. Noted Jan. 23, C.D.—Jan. 30, E.N.-R., under "Contracts Awarded."

N. Y., Stamford—June 12, by Bd. Educ., Churchill Memorial Bldg., general contract, heating, ventilating, plumbing, electrical work for school. P.W.A. project. H. O. Fullerton, 152 Washington Ave., Albany, archt. Noted May 5, C. D.—May 7, E. N.-R.

N. Y., Whitesboro—June 23, by Bd. Educ., Whitesboro, constructing school. $150,000. A. F. Gilbert, 358 5th Ave., New York, archt. Noted Apr. 22, C. D.—Apr. 30, E. N.-R.

†**O., Marion**—June 19, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $100,000.

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†*Federal Government*

Public Buildings (Continued)

†**O., Nelsonville**—June 23, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

†**Pa., Ardmore**—June 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $135,000.

★**Pa., Lancaster**—June 22, by School Dist., superstructure Lancaster High School, incl. general heating and ventilating, plumbing and electrical contracts, also alternate bid for construction and equipment of a swimming pool to be contained within the building. $1,400,000. P.W.A. project. H. Y. Shaub, 204 North Queen St., archt. Noted Oct. 20, 1933, C.D.—Oct. 26, 1933, E.N.-R.

†**Pa., Meadville**—June 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office.

★†**S. C., Columbia**—June 16, by P. Wks. Administration, Housing Div., Wash., D. C., constructing Columbia Terrace Housing Project. Project H-5201. $500,000. Noted May 20, C. D.—May 28, E. N.-R.

†**S. C., Florence**—June 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling (except elevator), U. S. Post Office and Court House. $175,000; adv. E. N.-R., June 4.

†**Tenn., LaFollette**—June 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $64,000.

†**Tenn., Memphis**—June 19 (extended date), by P. Wks. Administration, Div. Housing, Wash., D. C., constructing superstructure of Lauderdale Courts Housing Project, Project H-3403. Noted May 1, C. D.—May 7, E. N.-R.

†**Tenn., Nashville**—July 3, by P. Wks. Administration, Housing Div., constructing superstructures of Andrew Jackson Courts Housing Project H-2102. Noted May 1, C. D.—May 7, E. N.-R., under "Contracts Awarded."

★†**Tex., Fort Worth**—July 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing narcotic farm buildings. $1,000,000. Noted May 19, C. D.—May 21, E. N.-R.

Tex., San Antonio—June 12, by Bd. Educ., c/o R. S. Mefefee, pres., for Southwest Junior High School, 1 story, 110x307 ft., monolithic concrete, cast stone trimmed, rein.-con., rein.-con. found., Steves Gardens. $160,000. Phelps & De Wees, Gunter Bldg., and L. M. J. Dielmann, 306 East Commerce St., archts. Noted Apr. 20, C. D.—Apr. 23, E. N.-R.

Tex., San Antonio—Bd. Educ., c/o R. S. Menefee, pres., Lavaca and Matagorda Sts. bids about June 15, for 1-2 story, 160x185 ft., irregular shaped Junior High School in Steves Gardens. $185,000. L. M. J. Dielmann, 306 East Commerce St., archt. Phelps & DeWees, Gunter Bldg., Bd. Archts. J. W. Beretta Engineers, Inc., Natl. Bank of Commerce Bldg., engrs. Noted May 26, C. D.—Apr. 23, E. N.-R.

†**Utah, Fort Duchesne**—June 26, by Dpt. Interior, 18th and G Sts., Wash., D. C., constructing 25 bed hospital, garage, doctors' home, nurses' quarters, 2 duplex cottages for employees, for Uintah and Ouray Indian Agency.

†**Wash., Bremerton**—July 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $121,000. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

Wis., Manitowoc—June 12, by Bd. Educ., heating and electrical work for Junior High School. $30,000. P.W.A. project. J. D. Chubb, 109 North Dearborn St., Chicago, Ill., archt.

Man., Winnipeg—June 22, by G. F. Bentley, city clk., supplying switching equipment for Slave Falls plant. Noted Dec. 26, C. D.

†**C. Z., Balboa**—July 1 (extended date), by Yards & Docks, Navy Dpt., Wash., D. C., constructing three 4 family quarters at Naval Radio Station, spec. 8120. Noted May 14, C. D.—May 21, E. N.-R.

P. R., Caquas—July 1, by P. Wks. Administration, Housing Div., Wash., D. C., constructing Caserio La Granja Housing Project 3000.

LOW BIDDERS

★†**N. Y., New York**—P. Wks. Administration, Housing Div., Wash., D. C., May 27, constructing Harlem River Housing Project, Project H-1302, from Caldwell Wingate Co., 101 Park Ave., New York, $2,584,000. Noted May 25, C. D.—May 14, E. N.-R.

CONTRACTS AWARDED

†**Ark., Morrilton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to A. F. Blair, Petersburg, Va., $52,157. Bids May 12. Noted May 14, C.D.—Apr. 23, E.N.-R.

Calif., Folsom—State Div. of Architecture, P. Wks. Bldg., Sacramento, heating and ventilating systems and sheet metal for new cell block at Folsom Penitentiary, to Ace Sheet Metal Wks., 444 Clementina St., San Francisco, $6,493. Bids May 19. Noted May 7, C. D.

†**Calif., Mare Island**—P. Wks. Officer, Mare Island, furnishing, installing refrigerating plant, complete in Building M-37, at Marine Barracks, to Parker Mfg. Co., 2625 Santa Fe Ave., Los Angeles, $1,721.

†**Calif., Point Bonita**—A. Fourchy, assoc. civil engr., 219 Administration Bldg., Government Island, Oakland, repairing and altering officers and crews' bathrooms, and officers' laundry, installing heating plant, plumbing fixtures and sanitary sewerage system, to J. H. Pinkerton, 927 Howard St., San Francisco, $4,775. Bids May 4. Noted May 14, C.D.

Colo., Boulder—Huntington School Dist., 2 and 3 story, basement, irregular sized, brick, stone, rein.-con. high school, to Mead & Mount Constr. Co., Denver National Bank Bldg., Denver, $389,000. P.W.A. Frewen & Morris, Huntington, Patterson Bldg., Denver, archts.

Conn., Ansonia—High School Building Committee, general contract 2 story, basement, 183x262 ft., brick, stone, concrete high school, to Wm. L. Crow Constr. Co., 101 Park Ave., New York, $243,678***electrical work, to Alfred E. Senecal Co., Box 35, Westfield, $18,158***plumbing, to Otto Epstein, Inc., 38 Elm St., Hartford, $15,766***heating and ventilating, to Herman Machine Constr. Co., 103 Park Ave., New York, $38,689. Grand total $316,291. Bids Apr. 30. Awards subject to P.W.A. approval. Noted Apr. 21, C.D.—Apr. 23, E.N.-R.

★†**D. C., Wash.**—Home Owners Loan Corp., Pennsylvania Ave. and 12th St., constructing building and elevator plant, to James Stewart, 230 Park Ave., New York, $1,446,700. Noted May 20, C. D.

†**Ga., Blakely** — Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Murphy Pound, Hill Bldg., Columbus, $47,675. Noted May 5, C. D.—Apr. 16, E. N.-R.

†**Kan., Sabetha**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Ernest Rokahr & Sons, Lincoln, $48,299. Bids Apr. 22. Noted Apr. 27, C. D.—Apr. 30, E. N.-R.

†**Ill., Champaign**—Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office, to A. Smith & Co., 124 North LaSalle St., Chicago, $125,352. Bids Mar. 26. Noted Mar. 30, C. D.—Mar. 5, E. N.-R.

Ill., Utica—Dpt. P. Wks. & Bldgs., Div. Architecture & Eng., Springfield, heating, plumbing for log lodge building and concession group buildings at Starved Rock State Park, to J. B. Ward, 2108 5th St., Peru, $18,279; electrical wiring, to Henry Newgard & Co., 549 West Washington St., Chicago, $7,747. P.W.A. Bids Apr. 15. Noted May 12, C. D.

†**Ind., Dunkirk** — Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to C. Westberg & Co., 6234 South Oakley Ave., Chicago, Ill., $40,393. Bids Mar. 27. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Ia., Rock Rapids—City, boilers for power plant, to Murry Iron Wks., Burlington; turbines, to General Electric Co., River Rd., Schenectady, N. Y. Bids May 7. Noted May 4, C. D.—Apr. 9, E. N.-R.

Mass., Greenfield—George H. Reed & Co., general contractors, 24 Franklin St., structural steel for brick, steel, concrete fire station, to Haarmann Steel Co., Ducharme Ext., Holyoke, for Town, Bd. Selectmen***roofing, to Ryan Bros., 193 High St.***electrical work, to Streeter Electric Co., 41 Federal St., Boston*** plumbing, to J. B. Kennedy, Newton Place*** heating, to G. V. Corsiglia, 10 Federal St. Noted Feb. 3, C.D.—Feb. 6, E.N.-R., under "Contracts Awarded."

Mass., Lowell—Aberthaw Co., general contractors, 80 Federal St., Boston, granite for 3 story, basement, 65x125 ft., brick, steel and stone Hanchett Memorial Hospital unit at Lowell General Hospital, to Perry Bros. Granite Co., 216 North St., Concord, N. H., for Lowell General Hospital***cast stone, to Cambridge Cement Stone Co., 156 Lincoln St.***limestone, to Indian Hill Stone Co., Bloomington, Ind.*** floors, to Grid Flat Slab Corp., 761 Dudley St., Dorchester. Noted May 21, C. D.—May 28, E. N.-R.

Mass., Newton—A. Piotti Co., general contractors, 708 Dudley St., Dorchester, heating for school in Oak Village Section, to P. A. Dolan Co., 237 Broadway, Boston, for City, H. A. Hageman, P. Building Comr., City Hall*** plumbing, to Jas. G. Gillespie Co., 708 Columbia Rd., Dorchester***electrical work, to Stanton Electric Co., 18 A T wharf, Boston*** structural steel, to Grossier & Shlager Iron Wks., 84 Washington St., Somerville***excavation, to D. M. Bernardi, 462 Washington St., Wellesley***limestone, to Alexander Thomson, Inc., 36 Albany St., Cambridge***steel erection, to E. C. Magoun, 320 Park Ave., Arlington ***light iron, to Quincy Ornamental Iron Wks., 161 A St., South Boston***glass, to Pittsburgh Plate Glass Co., 300 Babcock St., Brighton. Noted Mar. 26, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

Mass., Norwell—Town, Building Com., Town Hall, general contract 3 story, basement, 57x190 ft., brick, steel, timber high school, concrete found., Main St., to I. P. Rocheford, 8 Arlington Pl., Framingham***heating, to G. A. Beach, Central St., Norwell***plumbing, to James S. Cassedy, Inc., 133 Austin St., Cambridge***electrical work, to Barnes, Pope Co., 98 Brookline Ave., Boston. Est. about $140,000. Bids May 1, awarded May 14. R. Harrington Doane, 60 Batterymarch St., Boston, archt.

†**Mass., Worcester** — Poorvu-Heenan Constr. Co., general contractor, 51 Cornhill, Boston, excavation for U. S. Parcel Post Building, Harding and Franklin Sts., for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Caradonna Excavation Co., 702 Chandler St.***roofing and sheet metal work, to Columbia Cornice Co., 268 Elm St., Cambridge***steel windows, to Campbell Metal Window Corp., 38 Chauncy St., Boston***millwork, to Int. Building Equipment Co., 154 Everett Ave., Chelsea***hollow metal, to Jamestown Metal Equipment Co., Jamestown, N. Y. Noted Apr. 13, C. D.—Apr. 16, E. N.-R., under "Contracts Awarded."

†**Minn., Minneapolis**—P. Wks. Administration, Housing Div., Wash., D. C., constructing foundations for Sumner Field Housing Project H-4201, to Johnson, Drake & Piper, Inc., 1138 Baker Bldg., $178,533. Bids May 7. Noted May 19, C. D.

†**Mo., Fredericktown and Winona**—Dept. Agriculture, Forest Service, A. A. Janson, acting forest supervr., 719 Court House and Custom House, 12th Blvd. at Market St., St. Louis, constructing frame camp buildings, each camp includes office building $3,000; warehouse $2,500; oil house $400; water system $800; and grading grounds $500, day labor. (Correction —Cost of grading.) Noted May 26, C. D. under "Contracts Awarded."

†**Mo., St. Louis**—Treas. Dpt. at office Sup. Archt., Wash., D. C., changes in U. S. Post Office, to MacDonald Constr. Co., 3829 West Pine Blvd., $17,168. Bids Apr. 27. Noted May 5, C. D.—Apr. 9, E. N.-R.

Mo., St. Louis—G. Moeller Constr. Co. general contractors, 3520 Itaska St., excavating for 1 story, basement, 104x147 ft. rein.-con., brick police station Lucas Ave., for Bd. P. Service, City Hall, to Krummel & Janssen, 6408 Fyler Ave.***heating to Koppen-Smith, Heating Co., 2628 Olive St.***shades and blinds, to A. A. Klutho Co., 915 Syndicate Trust Bldg.***linoleum, to Stix Baer & Fuller, 6th and Washington Sts.***plastering, to P. Goeddel Plastering Co., 2849 Winnebago St.***lathing, to W. D. Baldwin, 821 Wainwright Bldg.*** roofing, to Trinidad Asphalt Mfg. Co., 600 South Theresa St.***granite, to Pickel Stone Co., 1320 South Vandeventer St.***counter, to E. A. Holscher, Office Furniture Co., 1106 Pine St.***iron work, to Kaysing Iron Wks., 2701 North 21st St.***Oil burner, to Jerry Jokerst Co., 4701 Washington St.***painting, to E. C. Simon, 4433 Nebraska St.***damproofing and waterproofing, to Contract Waterproofing Co., Railway Exchange Bldg.***brick work, to John Abelin, 6660 Hancock St.***precast slab, to Precast Slab & Tile Co., 4434 Hunt St.***cell equipment, to Pauly Jail Building Co., 2215 DeKalb St.***metal windows, to Mesker Iron Co., 424 South 7th St.***hollow metal, to Neidringhaus, Inc., 5739 Natural Bridge St.*** glass, to Pittsburgh Plate Glass Co., 3900 Chouteau St.***marble and terrazzo, to St. Louis Terrazzo & Mable Co., 4528 Oletha St. ***mill work, to Steimke Mfg. Co., 4096 Bingham St.***screens, to Zumwalt Co., 1617 Lafayette St.***plumbing, to W. L. Clucas & Co., 11 North Grand St.***electrical work, to C. H. Euler Electric Co., 4733 Morganford St. ***fire door and Kalamein work, to F. A. Camman, Century Bldg.***reinforcing steel and pans, to Truscon Steel Co., Mart Bldg.***sheet metal work, to J. Clemens Sheet Metal Co., 1908 South 7th St.***drayage and set boiler, to Daniel Hamm Drayage Co., 913 North Main St.***galvanized iron and duct work, to D. F. Edwards Heating Co., 2340 Pine St.***temperature regulation, to Minneapolis-Honeywell Regulator Co., 2831 Olive St.***insulation, to Mundet Cork Corp., 506 South Main St. Noted May 1, C. D.—May 7, E. N.-R.

†**Mont., Glendive**—Treas. Dpt. at office Sup. Archt., Wash., D. C., repairing U. S. Post Office, to J. Sterhan, Glendive, $10,000. Bids May 13. Noted May 19, C. D.—Apr. 23, E. N.-R.

†**Nev., Boulder City**—Bureau Reclamation, Denver, Colo., constructing sheet metal work for cooling and ventilating system for Boulder Dam Power Plant, to Rees Blow Pipe Mfg. Co., 340 7th Ave., San Francisco, Calif., $6,500. Bids Apr. 9. Noted Apr. 6, C. D.

N. Y., Bemus Point—Union Free School Dist. 4, general contract school, to J. J. Guinnana, 15 18th St., Jamestown***plumbing and heating, to Chatfield & Sharf, Inc., 17 East 3rd St., Jamestown***electrical work, to Linquist Electric Co., 309 North Main St. P.W.A. Bids May 16. Noted May 25, C. D.—May 7, E. N.-R.

N. Y., Berlin—Rathgeb-Walsh, Inc., general contractors, Portchester, tile, marble, slate and terrazzo for school for Central School Dist. 1, to Anthony Mion & Son, 428 Michigan Ave., Schenectady. Total est. $198,000. P.W.A. Noted Apr. 3, C. D.—Apr. 9, E. N.-R., under "Contracts Awarded."

N. Y., Binghamton—Bd. Educ., general contract North High School, Howard Ave., to W. A. Berbusse, Jr., 101 Park Ave., $454,000. P.W.A. Bids May 5. Noted May 7, C. D.

N. Y., Binghamton—Bd. Educ., heating for school, Howard Ave., to S. J. Evans, 1713 Riverview Dr. Endicott; electrical work, to E. A. Davis, 64 Conklin Ave. P.W.A. Bids May 5. Noted May 15, C.D.

†**N. Y., Buffalo**—Treas. Dpt. at office Sup. Archt., Wash., D. C., improving U. S. Coast Guard Station, incl. garage, boathouse, etc., to Huber & Fix, 860 Hertel Ave.

†**N. Y., Canandaigua**—Erwin & Leighton Co., general contractors, 650 tons reinforcing steel for additional building at U. S. Veterans Hospital, for Veterans Bureau, Arlington Bldg., Wash., D. C., to American Steel Eng. Co., 3520 Indian Queen Lane, Phila., Pa. Noted Apr. 24, C. D.—Apr. 30, E. N.-R., under "Contracts Awarded."

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Public Buildings (Continued)

N. Y., Churchville—Bd. Educ., general contractor, constructing school, to Swartout & Rowley, 548 Mount Hope Ave., Rochester. Est. $185,000. **P.W.A.** Noted May 25, C. D.—May 7, E. N.-R.

N. Y., Clymer—Bd. Educ. Central School Dist. 1, general contract school, to Haas Constr. Co., 1001 Monroe St., Jamestown***plumbing, to McGinity, Johnson Co., 214 Prendergast St., Jamestown***heating, to Quackenbush & Co., 597 Michigan Ave., Buffalo***electrical work, to Gabler Electric Co., 116 South 4th St., Olean. **P.W.A.** Bids Mar. 16. Noted Apr. 24, C.D.—Apr. 30, **E.N.-R.**

N. Y., Jefferson—Nelson Contg. Co., general contractors, Draper Ave., Schenectady, structural steel for school, to Utica Structural Steel Corp., Dwyer Ave., Utica, for Bd. Educ., Central School Dist. **P.W.A.** Noted May 5, C. D. —May 7, **E. N.-R.**, under "Contracts Awarded."

N. Y., Kendall—J. B. Pike & Son, general contractors, 1 Circle St., Rochester, roofing for school, for Central School Dist. 7, to G. Gallard, 10 Gunnison Ave., Rochester***glass and glazing, to Hires Turner Glass Co., 606 Hague St., Rochester***structural steel, to P. L. Hughes & Co., 1029 Lyell Ave., Rochester***metal lathing and plastering, to Henderson Johnson Co., East Erie Blvd., Syracuse***ornamental iron, to Faucher-Bereza Co., 42 Cumberland St., Rochester. Noted Mar. 30, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

N. Y., Lima—Iffland & Rogers, general contractors, 16 State St., Rochester, structural steel for school, Rochester St., to Leach Steel Corp., 160 Steel St., Rochester, for Union Free School Dist.; steel joists, to Concrete Steel Co., 207 James St., Syracuse. **P.W.A.** Noted Apr. 7, C. D.—Apr. 9, E. N.-R., under "Contracts Awarded."

N. Y., Lockport—Wright & Kremers, Inc., general contractors, Pine Ave. and Main St., Niagara Falls, reinforcing steel for public library, for City, Bd. Library Trustees, City Hall, to Truscon Steel Co., Sidway Bldg., Buffalo; metal lathing and plastering, to F. V. Seitz, 45 Avery Pl., Cheektowaga. **P.W.A.** Noted Jan. 20, C. D.—Jan. 23, **E. N.-R.**

N. Y., Marlboro—Central School Dist. 1, general contract school, to Millimet Constr. Co., 988 Bergenline St., Union City, N. J., $237,400 ***heating, to Duncanson & Tracy, 13 East 37th St., New York, $30,300***plumbing, to Worsfold & Hawvermale, Main St., Nyack, $22,-984***electrical work, to Rao Electric Co., Inc., 150 East 42d St., New York, $21,950. Grand total $312,634. **P.W.A.** Bids May 14. Noted May 20, C. D.

N. Y., Newburgh—L. H. Swenson, Inc., general contractors, 2 Cannon St., Poughkeepsie, reinforcing steel for regional market, for Lower Hudson Regional Market Authority, Congers, to Concrete Steel Co., Park Ave., New York; structural steel, to Poughkeepsie Iron & Metal Co., 6 Orchard Pl., Poughkeepsie. **P.W.A.** Noted Apr. 24, C. D.—Apr. 30, **E. N.-R.**, under "Contracts Awarded."

N. Y., New York—J. J. Lyons, pres. Bronx Boro. County Bldg., 161st St. and Grand Concourse, jail equipment work of Bronx County Jail, to Van Doran Iron Wks., 2685 East 79th St., Cleveland, O., $247,029. **P.W.A.** Bids May 14. Noted May 15, C. D.

N. Y., Ogdensburg—Bd. Educ., general contract constructing trade school, to W. J. Burns Co., 601 Jefferson City, Syracuse, $129,921*** plumbing, to Hameline Co., 529 West Oriskany St., Utica, $12,789***heating, to G. H. Hyde Co., Ogdensburg, $14,686. Grand total $157,-396. **P.W.A.** Noted May 26, C. D.—Apr. 16, E. N.-R.

N. C., Raleigh—State Hy. & P. Wks. Comn., W. L. Craven, bridge engr., constructing roofs at Pitt Co. and Scotland County Prison Camps, to Ingold Co., Hickory, $1,750 each. Est. $3,-500. Bids May 6, awarded May 12. Noted May 18, **C. D.**

N. M., Albuquerque—Bd. Regents, University of New Mexico, general contract 2 and 1 story, 60x120 ft. central heating plant and laboratory, University of New Mexico, to Thomas Bate & Son, 2311 10th St., Denver, Colo., $146,202. **P.W.A.** Bids May 14.

†O., Dayton — Vet. Bu., Arlington Bldg., boilers, stokers and equipment for veterans home, to Lorne Plumbing & Heating Co., 641 Congress St., Detroit, Mich., $43,784. Bids Apr. 14, awarded May 15. Noted Apr. 28, C. D.—Mar. 26, **E. N.-R.**

†Okla., Poteau—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to C. H. Barnes, Logansport, Ind., $48,-310. Bids Apr. 28. Noted May 1, C.D.—Apr. 2, **E.N.-R.**

Pa., Dunmore—Dunmore School Dist., F. G. Scott, secy., 30 room high school, general contract, to Karno-Smith Co., Broad St. Bank Bldg., Trenton, N. J., $258,800***heating and ventilating, to Walter P. Dunn Co., 42 Edison Place, Newark, N. J., $20,247***plumbing to J. M. Letteri, Dunmore, $10,990***electrical work, to Popka Eng. Co., 181 South Washington St., Wilkes-Barre, $15,288. Grand Total $305,-525. **P.W.A.** Bids May 19. Noted May 5, C. D.—May 7, **E. N.-R.**

†*Federal Government*

†Pa., Quakertown—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to H. E. Stoudt & Son, Allentown, $54,400. Noted May 20, C. D.—Apr. 30, **E. N.-R.**

R. I., Burrillville—Tucker Constr. Co., general contractors, 346 Washington St., Providence, painting, at hospital and administration building at Wallum Lake Sanatorium, for State, Emergency P. Wks. Comn., Providence, to Browning Decorating Co., 209 East 26th St., New York***roofing, to J. J. Fisher Co., 186 15th St., Brooklyn, N. Y.***marble, to Capitol Marble & Tile Co., Inc., 48 Oxford St., Providence***stone, to Heltonville Limestone Co., Bedford Ind.***iron, to Central Iron Wks., 33 Magnolia St., Providence***structural steel, to Bethlehem Steel Co., Bethlehem, Pa.***reinforcing steel, to Barker Steel Co., 238 Main St., Cambridge, Mass.***masonry, to Bowen Fireproofing Co., 101 Park Ave., New York*** plastering, to E. Nicholson, 501 Bay St. Bldg., Lawrence, Mass.***waterproofing, to J. J. Fisher Co., 186 15th St., Brooklyn, N. Y. Noted Dec. 17, C. D.—Dec. 26, **E. N.-R.**, under "Contracts Awarded."

R. I., Burrillville—State, Emergency P. Wks. Comn., State House, Providence, Contr. 1, general contract, power plant at Wallum Lake Sanatorium, to Pelletier Constr. Co., 173 Bailey St., Woonsocket, $31,726***Contr. 3, boilers, to Union Iron Wks., 80 Federal St., Boston, Mass., about $12,000***Contr. 4, steam distributing system, to Underground Steam Constr. Co., 75 Pitts St., Boston, Mass. $142,968*** Contr. 5, piping and auxiliary apparatus, to Hartwell Co., 87 Weybosset St., Providence, $36,250. Grand total $122,944. **P.W.A.** Bids Apr. 8, awarded May 22. Noted Apr. 16, C.D. —Nov. 14, **E.N.-R.**

R. I., Burrillville—State Emergency P. Wks. Comn., State House, Providence, plumbing, heating and process piping only for laundry building at Wallum Lake Sanatorium, to Frank Dupuis Co., 599 Main St., Pawtucket, $5,440. Bids Apr. 24, awarded May 21. Noted May 1, C.D.

R. I., Howard (Cranston)—Olaf Ahlborg & Sons, general contractors, 17 Friendly Rd., Cranston, painting psychiatric building at State Hospital, to H. Newton Marshall Co., 522 Harrison Ave., Boston, Mass., for State, Emergency P. Wks. Comn., Providence***roofing, to Eagle Cornice Co., 314 Blackstone St., Providence ***elevator, to F. S. Payne Co., 47 Mathewson St., Providence***plastering, to Oscar Trottier, Inc., 10 Whittaker St., Providence***building finish, to Pawtucket Sash & Blind Co., 22 Mason St., Pawtucket***structural steel, to James H. Tower Iron Wks., 50 Borden St., Providence*** reinforcing steel, to Truscon Steel Co., 87 Weybosset St., Providence***waterproofing, to Western Waterproofing Co., Inc., 82 West Dedham St., Boston, Mass. **P.W.A.** Noted Feb. 4, C.D.—Feb. 6, E.N.-R., under "Contracts Awarded."

R. I., Howard (Cranston)—Tucker Constr. Co., general contractors, 346 Washington St., Providence, masonry work for medical and surgical building, to Bowen Fireproofing Co., 101 Park Ave., New York, for State Emergency P. Wks. Comn., State House***stone, to Heltonville Limestone Co., Bedford, Ind.***reinforcing steel, to Truscon Steel Co., 87 Weybosset St., Providence***marble, to Capitol Marble & Tile Co., Inc., 48 Oxford St., Providence. **P.W.A.** Noted Apr. 16, C. D.—Mar. 11, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

†Tenn., Sparta—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Foley Bros., Erwin. $49,760. Bids May 15. Noted May 20, C.D.—Apr. 30, E.N.-R.

Tex., Amarillo—Bd. Educ., c/o J. B. Dooley, pres., superstructure 2 story, basement, 136x 200 ft., brick, rein.-con. Junior College building, to W. Frank Little Constr. Co., Amarillo, $134,-620. Est. $102,500. Foundation already in. Noted May 18, C. D.

Tex., Dallas — Highland Park Ind. School Dist., c/o Alecia Paschell, secy., Highland Park, general contract 2 story, basement, brick, rein.-con. high school, auditorium, classrooms, office, etc., to Central Contg. Co., Constr. Bldg., $329,-689***plumbing, heating and ventilating, to C. Wallace Plumbing Co., Inc., 2224 Summer St., Dallas, $64,578***electrical wiring, to Broome Electric Co., Amarillo, $16,660. Grand total $410,927. **P.W.A.** Bids Apr. 30. Noted Apr. 24, C. D.—Mar. 5, E. N.-R.

†Tex., Goose Creek—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Lundberg-Richter Co., Liberal, Kan., $52,900. Bids May 5, C.D.—Apr. 2, E.N.-R.

Va., Blacksburg—Virginia Polytechnic Institute of Virginia, constructing students' activities building, to Wise Contg. Co., 122 North Eighth St., Richmond, $210,400. **P.W.A.** Noted May 12, C. D.—May 14, E. N.-R.

Va., Richmond—Medical College of Virginia, general contract constructing out-patient and laboratory building for institution, to Wise Contg. Co., 122 North Eighth St., to exceed $208,000. **P.W.A.** Noted May 18, C. D.—May 21, E. N.-R.

†Va., Virginia Beach—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Peters Constr. Co., 247 Arcade Bldg., Norfolk. $62,345. Bids May 26. Noted June 1, C. D.—May 7, **E. N.-R.**

Wash., Pullman—Washington State College, general contract women's residence hall, to Hoard Eng. Co., 1331 3rd Ave., Seattle, $244,-146***plumbing, heating, ventilating, to Lord & Loryea, 423 Southeast Hawthorne St., Portland, Ore., $49,016***electrical work, to J. J. Agutter, 600 Harrison St., Seattle, $12,799. Grand total $305,961. Noted May 1, C. D.— May 7, E. N.-R.

Wis., Manitowoc—Bd. Educ., general contract for Junior High School, 2 story, basement, 65x 430 ft., to G. Sollitt Constr. Co., Chicago, Ill., $236,510***plumbing, to J. E. Robertson, 1409 Underwood Ave., Wauwatosa, $17,596. **P.W.A.** Heating and electrical work to be readvertised. Noted May 19, C. D.—May 21, E. N.-R.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Santa Rosa — Rosenberg Department Store sketches by C. Caulkins, Rosenberg Bldg., 2 story, 200x250 ft., rein.-con. store and office to replace structure destroyed by fire, 4th and D Sts. $175,000 or more.

Conn., Bridgeport — St. Vincents Hospital, 2820 Main St., plans by E. G. Southey, 955 Main St., 3 story, basement, brick, steel hospital wing, Main St. $375,000.

Conn., West Hartford (br. Hartford) — St. Thomas the Apostle Parish, J. F. Callahan, pastor, plans by J. J. McMahon, 187 Barker St., Hartford, and takes bids in July, 2 story, basement, 125x160 ft., brick, stone parochial school, 12 rooms and auditorium. $145,000. P. D. Bemis, 36 Pearl St., Hartford, engr.

Idaho, Boise—W. E. Pierce, Boise, plans by Wayland & Fennell, Idaho Bldg., Boise, constructing 6 story, basement apartment house. $275,000. Financing under way.

Ill., Alton—St. Joseph's Hospital, Alton, Ill., and Sisters of Charity of Western Province, c/o J. J. Cronin, dir. Natural Bridge Rd. west of Florissant Rd., Normandy, Mo., plans constructing rein.-con., brick, stone hospital, $300,-000-$350,000 with equipment.

Ill., Chicago — Lowenberg & Lowenberg, archts., 111 West Monroe St., soon takes bids altering and enlarging 4 story, basement, 125x 218 ft. Leader Store, 26th St. and Turner Ave., for Goldblatt Bros. Department Store, 3932 South Lincoln St.

Md., Baltimore—Federal Land Bank, Baltimore Trust Co., revised plans by Taylor & Fisher, 1012 North Calvert St., 6 story, basement, 80x144 ft. office building, St. Paul and 24th Sts. $450,000. Bids Apr. 30 rejected.

Mass., Malden — Leopold Friedman, 1540 Broadway, New York, plans by T. W. Lamb, 701 7th Ave., New York, theatre. Est. about $140,000.

Mass., Mendon — Mendon Unitarian Church, Mendon, plans rebuilding church. Est. about $140,000. Architect not appointed.

Mass., Newton — Newton Homes, Inc., 186 Hammond St., Chestnut Hill, plans by H. W. Ramsey, 184 Boylston St., Boston, 28 residences and garages, brick veneer, frame construction. Quincy, Mayflower and Hammond Rds. Total est. exceeds $150,000. Owner will let separate contracts.

Mo., Salem—Lyric Theatre Co., Salem, postponed bids to have been opened about May 15, constructing 2 story, part basement, rein.-con., brick theatre, shop and office building. B. F. Barnes, 4948 Lotus Ave., St. Louis, archts. Noted May 5, C. D.—May 7, E. N.-R.

N. J., Clifton—St. Paul's Roman Catholic soon lets contract, 1 story, basement, 67x107 ft. church with clerestory, Union Ave. and 2nd st. $250,000. P. C. Reilly, 111 5th Ave., New York, archt.

N. J., West Caldwell—J. A. Whitman, Park and Smull Aves., plans tract development and dwellings. $140,000 or more. Site acquired.

N. Y., Brooklyn—H. Rappaport, 51 Chambers St., New York, plans by I. Kallich, 375 Fulton St., group 2 story dwellings, East 36th St. near Avenue U. $140,000.

N. Y., Brooklyn—Marbert Homes, 158 Remsen St., plans by N. J. Sapienza, c/o owner, constructing group 2 story brick buildings, Ryder St. and Avenue T. $140,000 or more.

N. Y., Brooklyn—Trinity Hospital, 1835 East New York Ave., bids in December or later, constructing 6 story hospital addition. $250,-000. A. Weiser, 240 Madison Ave., archt. Noted Mar. 27, C. D.—Apr. 4, E. N.-R.

N. Y., Brooklyn—Thrump Holding Corp., 178-24 Devonshire Rd., Jamaica, plans by A. Fahr, 90-23 161st St., Jamaica, constructing group 1 story, brick dwellings, Cortelyou Rd. and East 42nd St. $140,000.

N. Y., Brooklyn—Caton Holding Corp., 2161 81st St., plans by T. A. Meyer, c/o owner, 6 story apartment, 1626 Caton Ave. Est. about $140,000.

N. Y., Buffalo—W. T. Spann, archt., 30 Henley Rd., soon lets contract 3 story store, 333 Main St., for Greene Estate, c/o H. Winship, Brisbane Bldg., Buffalo.

N. Y., Elmhurst—Winhill Corp., 1860 Bway., New York, plans by E. Fels, 18 East 44th St., New York, constructing group 2 story, brick dwellings, 52nd Rd. and 74th St. $140,-000.

N. Y., Flushing—Parsons Realty Co., P. G. Glickman, pres., 400 Bway., New York, plans

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Commercial Buildings (Continued)

by H. I. Feldman, 15 West 44th St., New York, 6 story apartment, 35th Ave. and Parsons Blvd. $225,000.

N. Y., Jamestown—Jamestown Mutual Insurance Co., H. G. King, secy., plans 2 story, 65x80 ft., brick, steel office building addition, East 4th St. To exceed $140,000. Razing present structures, awarded to Rosen Wrecking Co., Jamestown.

N. Y., Long Island City—Skillman Avenue Realty Corp., 535 5th Ave., New York, plans by H. I. Feldman, 15 West 44th St., 6 story apartment, Skillman Ave. and 43rd St. $200,000.

N. Y., Long Island City—Titus Homes, Inc., 75-12 Roosevelt Ave., Woodside, plans by Wurst & Bailey, 32-02 30th Ave., constructing group 4 story, apartments, 36th Ave. and 33rd St. $140,000.

N. Y., Middletown—Orange County Telephone Co., 19 John St., bids after June 15, constructing telephone building, John St. R. T. Graham, 25 Prospect St., archt. E. E. Seelye & Co., 101 Park Ave., New York, engrs. Noted May 18, C. D.—May 21, E. N.-R.

★**N. Y., New York**—Beth Israel Hospital, Stuyvesant Park, East, plans by C. B. Meyers, 31 Union Sq., constructing hospital, 17th St. near 2nd Ave. $1,000,000. Noted Feb. 9, 1933, C.D.—Feb. 19, 1933, E.N.-R.

N. Y., New York—G. Gettenberg, 562 West 164th St., plans by H. I. Feldman, 15 West 44th St., 6 story apartment, 277 Fort Washington Ave. Est. about $140,000.

N. Y., New York—Hill Dale Properties, Inc., 291 East 134th St., plans by H. Ginsbern, 205 East 42nd St., 6 story, 91x137 ft. apartment, 172 Bennett Ave. $175,000.

N. Y., New York—Kadyah Glass, 816 Avenue N, Brooklyn, plans by H. I. Feldman, 15 West 44th St., constructing 6 story apartment, Billingsley Terrace and Sedgewick Ave. $250,000.

N. Y., New York—S. Minskoff, 521 5th Ave., plans 6 story apartment, Sheridan Ave. near Mount Eden Ave. $150,000. Site acquired. Architect not appointed.

N. Y., New York—New York Life Insurance Co., 51 Madison Ave., plans by J. M. Berlinger, 17 East 49th St., altering 25 story hotel, 1282 Bway. $38,000.

N. Y., New York—One Hundred Seven to One Hundred Nine Bowery Holding Corp., 2303 Avenue K, Brooklyn, plans by S. F. Oppenheim, 26 Court St., Brooklyn, altering heating, plumbing store and apartment, 109 Bowery. $37,000 with equipment.

N. Y., New York—One Hundred Sixty-Four East 59th Street Corp., 654 Madison Ave., plans by J. H. Barry, 314 East 41st St., altering heating, plumbing in store and office, 982 3rd Ave. $60,000.

N. Y., New York—Rosewin Realty Corp., 1000 Fox St., plans by W. J. Hohauser, 1841 Bway., 6 story apartment, Fairmount Pl. near Clinton Ave. Est. about $140,000.

N. Y., New York—Salvador Realty Corp., 25 Bway., plans by Schwartz & Gross, 347 5th Ave., altering 12 story apartment, 252 West End Ave. $160,000.

N. Y., New York—William Weinraub, c/o I. Feldman, archt., 15 West 44th St., 6 story apartment, near 197th St. and University Ave. Est. about $140,000.

N. Y., New York—Windsor Equities, Inc., 134 West 22nd St., plans by J. Bleich, 565 East Tremont Ave., altering heating, plumbing in 5 story apartment, 504 East 88th St. $40,000 with fixtures.

N. Y., Saratoga Springs — Skidmore College bids in summer or fall, constructing library, $250,000. L. E. Jallade, 681 Madison Ave., New York, archt.

N. Y., South Jamaica — Edelwilde Mansons, Inc., 424 Albany Ave., plans by W. Sambur, 162-02 Jamaica Ave., Jamaica, constructing group 1 story dwellings, 158th St. and 145th Rd. $140,000.

N. Y., Springfield—L. and L. Realty Corp., 127-05 Merrick Rd., plans by Lama & Proskauer, 383 Jay St., constructing group 2 story, frame dwellings, 132nd Ave. near 178th St. $140,000.

★**N. Y., Valley Stream** — Corporation, c/o Chanin Constr. Co., 122 East 42nd St., New York, plans group 1,000 dwellings on 300 acre site at former Curtis Airport. To exceed $1,000,000.

★**N. Y., Yonkers**—First National Bank of Tuckahoe, Tuckahoe, plans by Hall & Panpre, Bronxville, constructing 6 story apartment, Tuckahoe and Iroquois Rds. $500,000.

O., Cleveland — Syndicate, c/o Gaylord N. Fenga, Citizens Bldg., plans by Steffens & Fox, 1940 East 6th St., 6 or 8 brick, steel, concrete apartments. $400,000. Site not selected.

Pa., Sharon—Protected Home Circle Lodge, S. H. Hadley, pres., Scranton, sketches by Walker & Weeks, 2341 Carnegie Ave., Cleveland, O., 4 story, basement, 100x133 ft., stone, steel, concrete office. $250,000.

Pa., Spangler—Miners Hospital of Northern Cambria Co., H. David, chn. Building Comm., J. Maholtz, pres., plans by F. Sholar, 316 Commerce Bldg., Altoona, 4 story, basement, 40x106 ft., addition to hospital and also top

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story addition to present building, new steam heating system for new and old buildings, brick, tile, limestone trim construction $145,000. P.W.A. project.

Tex., Austin—American-Statesman, American-Statesman Bldg., plans 2 story, 82x128 ft., brick, stone, rein.-con. office and store building, plain found. L. D. Royer, 911 Smith-Young Tower, San Antonio, mechanical engr. W. E. Simpson, Inc., Milam Bldg., San Antonio, structural engr.

Utah, Salt Lake City—Zion's Security Corp., 40 North Main St., Salt Lake City, plans by Montgomery Ward Architectural Staff, West Chicago and North Larrimore Sts., Chicago, Ill., 3 story, basement, 109x157 ft. store. $250,000.

Wis., Neenah—Kimberly-Clark Corp. soon lets contract 3 story, 85x100 ft. office building. Private plans.

N. S., Antigonish—Bd. of Governors St. Francois Xavier University, making plans new building. $150,000. Private plans.

Ont., Ottawa—Chas. Ceappy, 575 McLaren St., soon takes bids brick, steel apartment house, plain found., O'Connor St. Est. about $150,000.

Ont., St. Catharines — T. Eaton Co., 190 Yonge St., Toronto, plans by S. H. Maw, 9 Elm St., Toronto, new store to replace premises burned. $150,000.

Ont., Stoney Creek — Highway Homes Ltd., Hamilton, preparing plans constructing 115 houses. $300,000.

Que., Lachine—Soeurs de Sainte Anne, plans by J. E. Labiberte & A. Gravel, 308 St. Catherine St. W., Montreal, new wing to noviciate, St. Catherine St. $200,000.

Que., Lennoxville — Bishop's College School, G. E. Montgomery, chn. Com., K C St. James St., Montreal, plans college building. $150,000 **Maturity in autumn.**

Que., Montreal—Bell Telephone Co., Beaver Hall Hill, purchases site covering 22,000 sq.ft. on Cote des Neiges Rd., and plans exchange building.

BIDS ASKED

Mo., Kirkwood—See "Contracts Awarded."

N. J., Newark—See "Contracts Awarded."

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Buffalo—J. J. Geigand, archt., 346 Herman St., taking bids 4 story, 60x100 ft. apartment, Humboldt Parkway, for Humboldt Corp., 518 Humboldt Parkway.

N. Y., Chestertown — St. John the Baptist Roman Catholic Church, Chestertown and North Creek, bids about June 1, constructing large stone, steel church, plain found., Main St. Gander, Gander & Gander, 17 Steuben St., Albany, archts. Noted Apr. 16, C. D.—Apr. 23, E. N.-R.

N. Y., Flushing—See "Contracts Awarded."

N. Y., Forest Hills—See "Contracts Awarded."

N. Y., Johnson City—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., Olean — Emanuel Lutheran Church, Laurens St., soon lets contract constructing large stone, steel church, plain found., 4th St. Biey & Lyman, 505 Delaware Ave., Buffalo, archts. Noted Mar 26, C. D.—Apr. 2, E. N.-R.

CONTRACTS AWARDED

Ala., Talladega—Bemis Bros. Bag Co., 2 story, basement, 100x140 ft., brick, rein.-con. community building, to Duke Stickney Co., Anniston. Bids Mar. 2. Noted Feb. 28, C. D.

★**Calif., Los Angeles**—Chapman Estate, 615 South Alexandria Ave., constructing Spanish Village, consisting of 10 hotel bungalows and a replica of a Spanish cathedral to be used for musical recitals and art exhibits, rein.-con., frame and stucco construction, north side of Willshire St., to Wm. Simpson Constr. Co., 1007 Architect Bldg., about $600,000. Noted Nov. 14, C.D.—Nov. 21, E.N.-R.

Mass., Roxbury—New England Baptist Hospital, A. H. Curtis, pres. Bd. Trustees, general contract 5 story, basement, 53x130 ft., brick, steel, cast stone hospital, concrete found., Parker Hill Ave., to Aberthaw Co., 80 Federal St., Boston, to exceed $140,000•••heating, to P. A. Dolan Co., 237 Bway., Boston•••plumbing, to Downey Co., 791 Tremont St., Boston •••electrical work, to Lord Electric Co., 303 Columbus Ave., Boston. Bids May 12. Noted Apr. 30, C. D.—May 7, E. N.-R.

Mo., Ferguson — Ferguson Amusement Co., general contract 1 and 2 story, rein.-con., brick, steel theatre, 700 seating capacity, to Dunham-Daly-Morley Constr. Co., 4341 Maffit Ave, St. Louis.

Mo., Kirkwood—Roloff Development Co., 140 South Kirkwood Rd., 1 story, basement, 54x125 ft., motion picture theatre, Kirkwood Rd., south of Pittman Pl., own forces. O. W. Stiegemeyer, 4817 Oleatha Ave., St. Louis, archt.

Mo., St. Louis — Leko Realty Co., c/o S. Levin, atty., 417 Pierce Bldg., 5th and Pine Sts., general contract 1 and 2 story, basement, 97x205 ft., rein.-con., brick, steel, stone theatre and store building, Grand Blvd. and Natural Bridge Ave., to S. Abrams & Son, Wainwright Bldg.•••electrical work, to S. C. Sachs, Inc., 817 North 9th St.•••plumbing, to S. Burman & Co., 2824 Olive St.•••structural steel, to Spunk Iron & Fdry. Co., 3145 North 14th St. •••heating, ventilating, air conditioning and temperature control, to Natkin & Co., 3624 Washington St. Est. $175,000, incl. [illegible] Bids May 4. Noted Apr. 28, C. D.—Apr. 1[illegible] E. N.-R.

N. J., Newark—First Colonial Realty Corp., c/o N. Harris, archt., 60 Park Pl., 5 story basement, brick, 50 family apartment houses, incl. elevators, air conditioning, on [illegible] and Elizabeth Aves., separate contracts. [illegible],000.

N. Y., Albany—Our Lady Help of Christian, general contract convent and school, [illegible] Ave. to W. J. Murray Constr. Co., 41 South Pearl St.; plumbing and heating, to J. Smith, 1074 Clinton Ave., Albany. Est. $150,000. Noted May 14, C.D.—May 21, E.N.-R.

N. Y., Bayside—N. Brait, 215 Montague St., Brooklyn, constructing group frame dwellings, 33rd Rd. and 210th St., separate contracts awarded. $140,000. D. J. Levinson, 163-18 Jamaica Ave., Jamaica, archt. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

N. Y., Brooklyn—H. Waxman, 2031 [illegible] St., constructing group 2 story dwellings, [illegible] 60th St. and vicinty, separate contracts now being awarded. $140,000. I. Kallich, 375 Fulton St., archt. Noted Apr. 20, C. D.—Apr. 23, E. N.-R.

N. Y., Brooklyn—Hampton Realty Corp., 313 4th Ave., constructing group 2 story brick dwellings, vicinity of 341 Remsen Ave. near Lenox Rd., day labor and separate contracts, $140,000. Owner now purchasing materials. E. O. Holmgren, 373 Fulton St., archt. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

N. Y., Brooklyn—Brooklyn Hebrew Home & Hospital for Aged, 813 Howard St., 600 tons structural steel for home and hospital, 813 Howard St., to Ingalls Iron Wks. Co., 1 East 42nd St., New York. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

N. Y., Brooklyn—Adrian Van Sinderen, 40 Remsen St., altering heating, plumbing in 6 story apartment, 423 Hicks St., separate contracts to be awarded soon. $40,000. Noted May 1, C. D.—May 7, E. N.-R.

N. Y., Brooklyn—Ridge Colonial Corp., 120 Flatbush Ave., constructing group 2 story, brick dwellings, 251 Dahlgren Pl., separate contracts and day labor. $140,000. S. Malkind, 105 Court St., archt. Noted Apr. 29, C. D.—May 7, E. N.-R.

N. Y., Brooklyn—Ridgelawn Homes, Inc., 640 86th St., group 2 story, brick dwellings, 644 90th St., day labor and separate contracts, $140,000. Owner is purchasing materials. R. H. Bryson, 16 Court St., archt. Noted Apr. 27, C. D.—Apr. 30, E. N.-R.

N. Y., Flushing—Supro Homes, Inc., 120-08 97th Ave., constructing group 2 story dwellings, 58th Ave. and Main St., day labor. $140,000. Owner is purchasing materials. D. J. Levinson, 163-18 Jamaica Ave., Jamaica, archt.

N. Y., Forest Hills—Forest Hills Realty & Homes, Inc., National Title Bldg., Jamaica, constructing group 2 story, frame dwellings, Ingram St. near Herrick Ave., separate contracts, $140,000. J. E. Cahill, 89-64 163rd St., Jamaica, archt. Noted Apr. 27, C. D.—Apr. 30, E. N.-R.

N. Y., Johnson City—Endicott Johnson Corp., G. M. Johnson, pres., constructing residences on Riverside Dr., Ethel and Baldwin Sts., own forces. To exceed $140,000. Private plans. C. R. Nimmons, c/o owner, in charge.

N. Y., Laurelton — English Cottage Homes, 45-47 49th St., constructing group 1 story, frame dwellings, Cross Island Blvd., near 131st Rd., separate contracts now being awarded, $140,000. A. Fahr, 90-23 161st St., Jamaica, archt. Noted May 21, C. D.—May 28, E. N.-R.

N. Y., New York—Armstrong-Buchnell Co., Inc., 300 Madison Ave., altering heating, plumbing in 5 story apartment, 65 West 106th St., separate contracts. $50,000 with fixtures. A. L. Wilson, 276 5th Ave., archt. Noted Apr. 27, C. D.—Apr. 30, E. N.-R.

N. Y., New York—Bd. Northern Baptist Convention, 152 Madison Ave., altering heating, plumbing in 3 story tenements, 147-149 East 45th St., separate contracts. $37,000. J. M. Berlinger, 17 East 49th St., archt.

N. Y., New York—Corporation, c/o A. Giordano, 2488 Grand Concourse, 6 story apartment, 199th St. and Valentine Ave., separate contracts now being awarded. $200,000. C. Kreymborg, 349 East 149th St., archt.

N. Y., New York—Fifth Avenue and 12th St. Corp., 55 5th Ave., altering heating, plumbing in 5 story apartment, 425 West 57th St., separate contracts. $45,000 or more with fixtures. Minoque & Palmer, 17 East 49th St., archt. Noted May 11, C. D.—May 14, E. N.-R.

N. Y., New York—Greenwich Savings Bank, 1356 Bway., altering heating, plumbing in 5 story apartment, 153 East 48th St., separate contracts. $80,000. P. O. Silberstone, c/o owner, archt. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

N. Y., New York—Two Thousand Twenty-Eight Broadway, Inc., 152 West 42nd St., altering heating, plumbing in store and apartment, 2030 Bway., separate contracts awarded. L. Schiff, in charge. $75,000. Schwartz & Gross, 347 5th Ave., archts.

N. Y., New York—Stern Bros., 41 West 42nd St., constructing 8 escalators in store, to Otis Elevator Co., 11th Ave. and 26th St., about $200,000.

N. Y., New York — Missionary Sisters of Sacred Heart, general contract 3 story, 60x130 ft. hospital, to Domenick Marinucci, 91 East

†*Federal Government*

Commercial Buildings (Continued)

Mosholu Parkway. Est. $175,000. All separate contracts awarded. Noted Jan. 25, C. D. —Jan. 31, E. N.-R.

N. Y., New York—Northwest Servicing Corp., 1601 University Ave., 6 story apartment, 174th St. and Walton Ave., separate contracts. $275,000. Owner now taking bids I. Hass, in charge, J. M. Felson, 250 West 57th St., archt. Noted Apr. 25, C. D.—Apr. 30, E. N.-R.

N. Y., St. Albans—Bellwin Realty Co., c/o D. Campbell, Natl. Title Bldg., Jamaica, constructing group 1 story, frame dwellings, 205th St. and 116th Ave., separate contracts now being awarded. $140,000. J. E. Cahill, 89-64 163rd St., Jamaica, archt. Noted Apr. 23, C. D. —Apr. 30, E. N.-R.

N. Y., Schenectady—Eastern New York Orthopedic Hospital School, 1090 Baker Ave., general contract hospital, Rosa Rd., to John Dunguid & Sons, 1041 Wavery Pl. Est. $140,000. Noted May 15, C.D.—Apr. 30, E.N.-R.

N. Y., Syracuse—Dawson Bros. Constr. Co., general contractors, Union Bldg., reinforcing steel for parochial school, Colvin St., for St. Anthony of Padua Roman Catholic Church, 1605 Midland Ave., to Truscon Steel Co., Gurney Bldg.; painting, to H. Masterson, 107 McAllister Ave. Noted May 21, C. D.—May 28, E. N.-R., under "Contracts Awarded."

N. Y., Yonkers — Julia Dyckman Andrus Memorial Hospital, two 3 story, basement dormitories, 1156 North Bway., to M. H. McGuire, Yonkers, $150,000. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

O., Hamilton—St. Ann Catholic Church, constructing 100 ft., basement, 52x150 ft., cut stone, concrete church, plain found., to E. Honnert, Colerain Pike, Cincinnati. Est. $200,000. E. J. Schulte, 920 East McMillan St., Cincinnati, archt. Noted Feb. 5, C. D.—Feb. 13, E. N.-R.

Tenn., Memphis—Peabody Hotel, c/o Manager, furnishing, installing Airtemp air conditioning system in Peabody Hotel, to Woodson & Bozeman, $35,000. Est. $40,000. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

Va., Staunton—Warner Bros. Pictures, 321 West 44th St., New York, constructing theater, to Associated Constr. Co., Munsey Bldg., Wash., D. C. Est. $140,000 or more. J. Eberson, 1560 Bway., New York, archt.

Wis., Watertown—St. Marys Hospital, general contract 3 story, 58x68 ft. and 41x65 ft. addition to hospital, to H. F. Mallow & Son, Co., 301 Warren St.; plumbing, to O. Biefeld Co., Watertown. E. Brielmaier & Sons, archts., 735 North Water St., Milwaukee, taking bids for heating addition to boiler plant. Noted Apr. 24, C. D.—Apr. 30, E. N.-R.

Que., Quebec City—Administrative Bd. L'Enfant Jesus Hospital, brick, steel, stone hospital, Lacanadiere Rd., to Pondrier & Boulet, Quebec City, $200,000.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., San Francisco—FACTORY—Hyman & Appleton, archts., 68 Post St., soon take bids rein.-con. factory addition, Williams and Newhall Sts., for Pacific Can Co., Williams and Newhall Sts. Est. $25,000, exclusive of equipment.

Calif., Santa Clara—EVAPORATING PLANT—C. H. Baker Evaporating Co., Reeve and Lafayette Sts., plans rebuilding evaporating plant. $40,000 loss.

Conn., Bridgeport—PLANT—Bridgeport Brass Co., East Main St., H. W. Jones, vice-pres., sketches modern brass rolling mill, Housatonic Ave. and Grand St. $150,000 or more. Probable archt. Fletcher-Thompson, Inc., 1336 Fairfield Ave. Owner plans purchasing full equipment for new brass rolling mill, incl. electrical treatment, heat treating furnaces, rolling machines, etc., and machine tools and other metal working equipment needed.

★ **Ind., Evansville**—BREWERY—W. J. Wittekindt Brewing Co., 200 West Morgan St., soon lets contract remodeling and constructing 4 story, 88x147 ft., brick, rein.-con. brewery addition, incl. 75 ft. steel stack, 60 hp. boilers, refrigeration equipment, steel and wood tanks, 32 motors, ½-60 hp. wash house, racking room, pitching room, machinery, copper brewing piping, deep well pump, 50,000 gal. cap. per 24 hr., on West Morgan St. $1,000,000. K. Kiel, 1215 Windsor Dr., Dayton, O., engr.

Ind., Evansville — POWER PLANT — Servel, Inc., Evansville, soon lets contract steam power plant and equipment. To exceed $40,000. Sanderson & Porter, 52 William St., New York, engrs.

Md., Baltimore—FACTORY—Crosse & Blackwell Co., 6801 Eastern Ave., soon lets contract 3 story, basement, 70x140 ft., rein.-con., brick, steel sash factory addition. $75,000. L. R. White, Jr., 10 West Chase St., archt.

Mass., Gardner—BOILER PLANT—Heywood, Wakefield Co., Lake St., soon lets contract 1 story, basement, 53x67x37 ft., brick, structural steel boiler plant, concrete found., Lake St. Electrical work by owners, who also purchase equipment. F. J. Sill, East Main St., Westboro, engr.

Mich., Detroit—FACTORY—Climax Molybdenum Co., Woodrow Wilson Ave., plans by C. W. Dickey, 2225 David Stott Bldg., 60x200 ft., steel, brick, concrete factory, plain found.; Woodrow Wilson Ave. $40,000.

★ **Mich., Detroit** — LABORATORY — General Motors Corp., General Motors Bldg., plans by Albert Kahn, Inc., New Center Bldg., 11 story, basement, 150x180 ft., brick, rein.-con., steel research laboratory building, plain found., Milwaukee Ave., and 2nd Blvd. $1,000,000. Noted May 29, C. D.

Mich., Menominee — WAREHOUSE — Bosch Brewing Co., Houghton, A. Heidcamp, genl. mgr., plans warehouse to serve this area.

Minn., South St. Paul — PLANT — Morris Rifkin, 227 Fifth St. N., plans 1½ story rein.-con., brick packing plant, $100,000. Plant to be operated by Rifkin & Son.

N. J., Newark—STORAGE—J. H. Reinfeld, Inc., Frelinghuysen and Noble Aves., plans by F. Grad, 48 Commerce St., 3 story distribution storage. $100,000.

N. J., Orange—FACTORY—Monroe Calculating Machine Co., 555 Mitchell St., soon lets contract constructing factory for Monroe Calculating Co., Epple & Kahrs, 15 Washington St., Newark, archts.

N. Y., Binghamton — BREWERY — Evans Brewery Co., Binghamton, E. J. Whalen, pres., and First National Bank, Binghamton, co-owners, purchased old Laurer Brewery and plans remodeling and re-equipping plant, incl. brewing machinery and equipment. To exceed $37,000. May construct addition to same in 1937.

Features of Daily Service

The McGraw-Hill *Construction Daily* offers these features: Daily reports on Proposed Work, Bids Asked, Low Bidders and Contracts Awarded. Weekly Summary of Bond Elections and Bond Sales. The McGraw-Hill *Construction Daily* is mailed first class and air mail, 5 times per week. Subscription rate $10 per month ($1 additional for air mail). Business News Department, *Engineering News-Record*.

N. Y., Brooklyn — WAREHOUSE — Robbins Dry Dock & Repair Co., 99 Beard St., plans by F. R. Harris, c/o owner, repairing fire damage to 4 story warehouse, 99 Beard St. Est. about $37,000 with equipment.

N. Y., Buffalo—COLD STORAGE—Iroquois Beverage Corp., 230 Pratt St., plans by J. Schultz & Son, 1370 Main St., 2 story, 100x100 ft., brick, concrete cold storage building, plain found., Pratt St.

★ **N. Y., Hudson** — PLANT—Universal Atlas Cement Co., 208 LaSalle St., Chicago, Ill., soon takes bids general contract (exclusive of structural steel), constructing cement plant. Total est. $1,000,000. Structural steel, to American Bridge Co., 208 South LaSalle St., Chicago, Ill. A. G. Carlson, c/o owners, archt. Noted May 26, C. D.—June 4, E. N.-R.

N. Y., New York—FREIGHT TERMINAL—Mrs. Jessie E. Moffat, c/o Freedman Freight Service, lessee, 95 Morton St., plans by C. F. Pruit, 342 Madison Ave., 2 story, motor freight terminal, Spring and Washington Sts. To exceed $40,000.

N. Y., New York—GARAGE, etc.—Immigrant Industrial Savings Bank, 51 Chambers St., plans by D. S. Lang, 200 Bway., 1 story, brick, steel garage, shop and service station, 400 East 23rd St. Est. about $37,000 with equipment.

N. Y., New York — STORAGE, etc. — Consolidated Edison Co., 4 Irving Pl., plans altering heating, plumbing in storage and showroom, offices, 157 Hester St. $40,000. Private plans.

N. C., Monroe—PLANT—Henderson Roller Mills plans rebuilding 4 story plant, destroyed by fire. To exceed $37,000. $75,000 damage to plant and equipment.

O., Coldwater — MILK CONDENSERY — Pet Milk Co., W. T. Nardin, vice-pres. and genl. mgr., Arcade Bldg., St. Louis, Mo., plans by Helfensteller, Hirsch & Watson, archts., Chemical Bldg., St. Louis, Mo., 1 and 2 story, rein.-con. milk condensery. $300,000 with equipment. **Maturity some time during 1936.**

Okla., Oklahoma City—GASOLINE PLANT—Phillips Petroleum Co., Bartlesville, made plans constructing twelve 400 hp. units to present casing head station at 28th and Prospect Sts. $200,000. A. H. Riney, Bartlesville, engr.

★ **Pa., Clairton**—WIDE STRIP MILL—American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, plans wide strip mill. $20,000,000. J. E. Graf, Frick Bldg., Pittsburgh, engr.

Pa., Duquesne — MANUFACTURING — Pittsburgh Contg. & Eng. Co., 811 Rebecca St., Wilkinsburg, and Royal Mfg. Co., 19 First St., soon takes bids 3 story, basement, 50x120 ft., brick, tile, steel, joist, manufacturing building, 22 North 1st St. Est. $40,000.

Pa., Erie—PLANT—Erie Resistor Corp., West 12th St., plans 3 story, 56x85 ft., brick, steel addition to electrical products manufacturing plant, incl. installing new machinery and equipment, West 12th St. **Maturity soon.**

Pa., Essington—PLANT—Linde Air Products Co., 30 East 42nd St., New York, plans branch plant. $100,000 or more. Private plans.

Pa., Pittsburgh—BAKING PLANT—Kroger Grocery & Baking Co., Cincinnati, O., soon takes bids altering baking plant, consisting of moving present equipment, new refrigeration equipment, etc., 21st St. and Railroad. $75,000. R. J. Bear, ch. engr., and A. J. Faulhaber, asst. engr., 35 East 7th Ave., Cincinnati, O.

Pa., Pittsburgh—PLANT—Butler Gas Products Corp., A. H. Steinbrecher, in charge, 40th St., Pittsburgh, soon lets contract 2 story, 50x100 ft., concrete block, gas products manufacturing building, 40th and AVRR. Private plans.

★ **Pa., Springdale** — POWER PLANT — West Penn Power Co., H. L. Mitchell, pres., plans power plant, incl. three 60,000 hp. new steel boilers, 50,000 kw. super-turbo generator, 2 story, basement, 70x25 ft., brick, steel office building, incl. storerooms, and machine shops. Est. $5,500,000. Sanderson & Porter, 52 William St., New York, engrs. Starting work on power plant, completing plans on office building.

Pa., Waynesboro—FACTORY—Wayne Tool Co., R. Frantz, mgr., plans rebuilding 1½ story factory building destroyed by fire. $150,000 fire loss. **Maturity soon.** Private plans.

Pa., Williamsport—SERVICE STATION—Firestone Tire & Rubber Co., 1278 South Main St., Akron, O., plans razing present structure and erecting modern steel tile, concrete super service station and distributing center for central Pennsylvania, incl. installing several 500 gal. steel tanks, electric pumps, air compressors, etc., 4th and Market Sts. $65,000.

Pa., York—LUMBER YARD—John H. Meyers & Son Lumber Co., J. H. Myers, pres., 1283 West King St., plans rebuilding lumbar yard destroyed by fire, incl. construction of four 74x110 ft. fireproof storage sheds and other buildings, West King St. To exceed $37,000. **Maturity soon.**

S. D., Sioux Falls—SHOP—Wilberg & Sons plans shop and garage. $37,000 with equipment.

Utah, Garfield—PLANT—American Smelting & Refining Co., 120 Bway., New York, plans sulphur extraction from wastes and gases (auxiliary to smelter), $150,000.

★ **Wash., Everett**—PLANT—Soundview Pulp Co. officials will build addition if city provides 12,000,000 gal. water and an option on 12,000,000 additional gal. $2,000,000. City votes shortly constructing $1,300,000 pipe line to furnish water. Noted Oct. 18, C. D.—Oct. 24, E. N.-R.

Wash., Lynden—WAREHOUSE—Washington Cooperative Egg & Poultry Assn., 201 Elliott Ave. W., soon takes bids 1 story, basement, 40x120 ft., steel, rein.-con. warehouse. $55,000. J. L. G. Meyer, 201 Elliott Ave. W., engr.

★ **Wyo., Rock Springs**—COAL TIPPLE—Lion Coal Co., Ogden, plans rebuilding coal tipple at mine. Original tipple destroyed by fire. $500,000. R. Y. Gibson, Rock Springs, supt.

Alta., Edmonton—PLANT—Grant Eng. Co. Ltd., Montreal, Que., plans plant for processing Alberta coal. $350,000.

B. C., Vernon—PACKING HOUSE—Vernon Fruit Union Packing House plans 100x175 ft. packing house, and 75x175 ft. cold storage plant. $70,000.

Man., Morris — REFINERY — L. Veillard (owner and engr.), Veillardville, Sask., preparing plans sugar beet refinery. $150,000. This summer construction and bonds will be guaranteed by Manitoba Government.

Ont., Alcona—MINE—Split Lake Gold Mines, Ltd., plans extensive development and purchase of large hoist. H. L. Donaldson, engr., interested in mine machinery catalogs.

Ont., Leamington—STORAGE—H. J. Heinz Co., Erie St. S., plans by Hutton & Souter, Pigott Bldg. (3rd unit), 1 story, brick storage building, Erie St. S. $100,000.

Ont., Timmins—ROUNDHOUSE—Temiskaming & Northern Ry., North Bay, A. H. Cavanagh, genl. mgr., soon takes bids constructing 6 stall engine roundhouse and all necessary equipment.

Ont., Windsor—PLANT—Long Mfg. Co., 44 Edna St., P. H. Chapman, mgr. (mfgrs. auto radiators), plans large addition.

Que., Montreal — MINES — Gateway Patricia Gold Mines Ltd., c/o H. R. Bain & Co. Ltd., 361 St. James W., plans development. $175,000. R. E. Hore, engr.

Que., Montreal—PLANT—Consolidated Lithograph Mfg. Co. Ltd., 800 Parthenais St., making plans large extension to plant.

BIDS ASKED

Calif., Oakland—PLANT—See "Contracts Awarded."

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†*Federal Government*

Industrial Buildings (Continued)

Conn., Bridgeport—SERVICE STATION—R. Voccola, 1320 East Main St., taking bids 1 story, 108x142 ft., brick, steel automobile station, East Main and Barnum Sts. $75,000. Fletcher-Thompson, 1336 Fairfield Ave., archts. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

Ga., Atlanta—PLANT—Chevrolet Motor Co., J. J. Black, supt., bids about June 15, constructing brick, stone, rein.-con. plant addition. Private plans.

Mass., Provincetown—POWER HOUSE—June 15, by Provincetown Power & Light Co., 1 story, 21x30 ft., brick, steel power house addition, concrete found. G. F. Clements, Hyannis, archt.

Mo., St. Louis — MARKET — Schenberg's Markets, Inc., M. Schenberg, pres., 8353 South Bway., taking bids superstructure 1 story, part basement, 83x130 ft. California-style open market, incl. refrigeration, Grand Blvd. near Winnegago St., $50,000. H. W. Guth, 427 Fuder Bldg., archt. Noted Mar. 30, C. D.—Apr. 2, E. N.-R.

N. Y., New York—COKE HANDLING PLANT —See "Contracts Awarded."

Pa., Warren—BARREL HOUSE—See "Contracts Awarded."

Que., Gatineau—FACTORY—Canadian International Paper Co., Victoria Bldg., Wellington St., Ottawa, Ont., taking bids factory, incl. drying rooms, kilns, sanding rooms, stockrooms, purchasing machinery to replace that destroyed by fire. Est. about $75,000. D. E. Read, supt. Noted Mar. 26, C. D.—Mar. 27, E. N.-R.

CONTRACTS AWARDED

Calif., Anaheim—PRECOOLING PLANT—Anaheim Citrus Fruit Assn., Anaheim, 3 story, 60x110 ft., rein.-con. precooling plant, 121 South Vine St., to Gay Eng. Corp., 2650 Santa Fe Ave., Los Angeles, about $55,000.

Calif., Covina—PRECOOLING PLANT—Covina Citrus Assn., Covina, 2 story, 60x90 ft., rein.-con. precooling plant, to Gay Corp., 2650 Santa Fe Ave., Los Angeles, about $50,000.

Calif., Oakland—MILLING PLANT—Taylor Milling Corp., 2201 East 7th St., 2 story, brick addition, to Western Industrial Eng. Co., 2223 East 39th St., Los Angeles, $20,000, exclusive of equipment.

Calif., Oakland—PLANT—Chevrolet Division of General Motors Co., General Motors Bldg., Detroit, Mich., reconditioning former Durant Motors plant, separate contracts and day labor. To exceed $40,000 with equipment.

Calif., San Diego—FACTORY—Consolidated Aircraft Corp., 3302 Atlantic St., San Diego, steel for aircraft factory addition, to Consolidated Steel Corp., 6500 East Slauson Ave., Los Angeles. Noted Apr. 3, C. D.—Apr. 9, E. N.-R.

Conn., Clinton—PLANT—Ponds Extract Co., general contract 3 story, 80x215 ft., rein.-con. plant, to Aberthaw Constr. Co., 80 Federal St., Boston, Mass. Est. $140,000. Private plans.

Conn., East Hartford (br. Hartford)—PLANT—United Aircraft Corp., c/o Hamilton Propellers Division, factory for manufacture of aircraft propellers, Main St., to R. G. Bent & Co., 93 Edwards St., Hartford. $250,000. Bids May 15. Noted May 14, C. D.—May 21, E. N.-R.

Conn., Hartford — FACTORY — Allyn Wadhams, general contractor, 15 Lewis St., steel for 1 story, 45x142 ft. factory addition and 15x40 ft. platform, to Standard Structural Steel Co., 1014 Wethersfield Ave., for Silex Co., 88 Pliney St.•••steel sash, to Truscon Steel Co., 42 Church St., New Haven•••roofing, sheet metal, to C. S. Bostwick, 41 Francise Ave. Noted May 22, C.D.—May 28, E.N.-R., under "Contracts Awarded."

Conn., Hartford — LABORATORY — Hartford Gas Co., 233 Pearl St., general contract altering and constructing extension to laboratory, storage unit and office, Front St., to Bartlett-Brainard Co., 16 Van Dyke Ave.•••marble, tile, to Hartford Tile Co., 9 Garvan St., East Hartford•••finish, to C. H. Dresser & Son, Inc., 287 Sheldon St.•••heating and plumbing, to Schaffer-Brandt, Inc., 480 Ann St. Est. $37,000.

Conn., Hartford—WAREHOUSE—R. G. Bent Co., general contractors, 95 Edwards St., excavating for 2 story, 120x200 ft., brick, steel, storage and recreation building, to R. H. Cone, 85 Lancaster Rd., West Hartford, for Colt Patent Fire Arms Mfg. Co., 17 Van Dyke Ave., S. M. Stone, pres.•••reinforcing steel, to Concrete Steel Co., 294 Washington St., Boston, Mass.•••steel column forms, to Delaurier Steel Mold Co., Jersey City, N. J. Noted May 18, C.D.—May 21, E.N.-R., under "Contracts Awarded."

Conn., Waterbury—PLANT—Largay Brewing Co., Inc., 1090 Bank St., general contract 2 story, brick, steel, concrete addition, to T. G. Smith Co., 18 Orange St. Est. $40,000. Noted May 18, C. D.—May 21, E. N.-R.

Conn., Waterbury—PLANT—Lux Clock Mfg. Co., Johnson St., general contract 1 story, basement and 3 story, basement, 40x160 ft. and 40x143 ft., brick factory additions, to Austin Co., 19 Rector St., New York. Est. $65,000. Bids May 9, awarded May 18. Noted May 5, C. D.—Apr. 23, E. N.-R.

Ga., Atlanta—PLANT—Chevrolet Motor Co., McDonough Blvd., J. J. Black, plant supt., constructing 1 story, brick, stone, rein.-con. plant addition, to A. K. Adams & Co., 542 Plum St. N.W., Atlanta, about $40,000. Noted Jan. 24, C.D.—Jan. 30, E.N.-R.

Ga., Rossville—MILL—Roswell Mills, Inc., weaving mill addition, to Batson-Cook Co., Rossville. Est. $37,000 with equipment.

Ind., Muncie—BOTTLING PLANT—Coca Cola Bottling Co., High and Willard Sts., bottling plant, to A. J. Glaser, Muncie, $38,000. Will purchase gas operated bottling machinery.

La., New Orleans—PLANT—Myles Salt Co. & Bay Chemical Co., 1007 Cap St., New Orleans, and Weeks Island, installing new sprinkler system and steel water towers for plant, Weeks Island, to Grinnell Co., Carondelet Bldg.; water towers, to Chicago Bridge & Iron Wks. Co., 1500 North 50th St., Birmingham, Ala. W. Moses & L. S. Weil, 427 South Peters St., New Orleans, engrs.

Md., Amcelle — PLANT — Celanese Corp. of America, 180 Madison Ave., New York, plant improvements, to G. Hazelwood, Amcelle. Est. exceeds $37,000. Contractor awarding separate contracts, incl. 1,200 structural steel.

Mass., Boston — GARAGE — Hegeman Harris Co., general contractors, 185 Devonshire St., heating for garage, to M. J. Flaherty Co., 342 Newbury St., Boston, for Railway Express Agency, Inc., 343 Congress St.•••plumbing, to C. H. Cronin, Inc., 14 Byron St.•••electrical work, to Mass. Electric Constr. Co., Inc., 333 Washington St.•••caissons, to Thomas Cavanagh, Inc., 46 Cornhill•••structural steel, to New England Structural Co., 310 2nd St., Everett•••roofing, to Columbia Cornice Co., 268 Elm St., Cambridge•••steel erection, to Daniel Marr & Son Co., 384 Dorchester Ave., South Boston. Noted Apr. 24. C. D.—Apr. 30, E. N.-R., under "Contracts Awarded."

Mass., Boston—PLANT IMPROVEMENTS—National Can Co., 110 East 42nd St., New York, and 71 Locust St., Boston, plant improvements, separate contracts awarded. Est. about $37,000 with equipment.

Mass., Cambridge — MARKET — Boston Regional Produce Market, Inc., Concord Ave., West Cambridge, 1 story, 30x100 ft., concrete, steel "Dealers Building," incl. heating, plumbing and electrical work, Concord Ave., to Marshall Caccavaro, 27 Faneuil St., Brighton. Awarded May 22. Noted May 20, C. D.—May 28, E. N.-R.

Mass., Cambridge—PLANT—Cambridge Gas Light Co., 354 3rd St., structural steel for gas manufacturing plant alterations and equipment, Third St., to New England Structural Co., 310 2nd St., Everett•••equipment, to Gas Mchy. Co., Waterloo Rd. and East 161st St., Cleveland, O.

Mass., Salem—FACTORY—Leslie R. Porter Co., general contractors, 156 Stuart St., Boston, electrical work for 1 story, 82x398 ft., 62x118 ft. factory units, to James Wilkinson & Co., 128 Oliver St., Boston, for Hygrade Sylvania Corp., 60 Boston St., Salem; waterproofing, to Chester Newman Co., Inc., 139 Main St., Cambridge. Noted Apr. 22, C. D.—Apr. 30, E. N.-R.

Mich., Detroit—PRESS SHOP—Chrysler Corp., Massachusetts Ave., Highland Park, constructing 1 story, brick, steel, concrete press shop, plain found., Wyoming Ave., to J. A. Utley Co., Manseur Ave. Est. $100,000. Noted May 11, C. D.—May 14, E. N.-R.

Mich., Lansing—PLANT—Motor Wheel Co., East Saginaw St., constructing plant addition, to G. Hagamier, Lansing. Est. about $75,000.

Mich., River Rouge—PLANT—Michigan Gas Transmission Co., constructing 1 story, brick, steel, concrete metering and measuring building for natural gas transmission plant, plain found., to Hazleton & Clark, 1038 Michigan Theatre Bldg. Est. $50,000. Private plans.

Mo., St. Louis—FACTORY—Kranz Automotive Body Co., 3032 Gravois Ave., excavating, concrete foundations, walls, carpenter and sheet metal work for automobile factory addition, Gravois and Minnesota Aves., to G. Moeller Constr. Co., 3520 Itaska St. Bids May 12.

N. J., Newark—WAREHOUSE—United Color & Pigment Co., 432 West 45th St., New York, 2 story, basement, 80x120 ft. brick, steel, storage warehouse, on Evergreen Ave., to J. Muscarelle, 20 Harrison Ave., Garfield. J. Brackett, c/o Research Lab., 432 West 45th St., New York, engr.

N. Y., Binghamton — PLANT — Binghamton Foundry & Machine Co., Floral Ave., reinforcing steel for plant addition, to Concrete Steel Co., 207 James St., Syracuse. Total est. $55,000. Noted Apr. 17, C. D.—Apr. 23, E. N.-R., under "Contracts Awarded."

N. Y., Buffalo—GRAIN ELEVATOR, etc.—Cooperative G. L. F. Mills, Inc., Chamber of Commerce Bldg., grain elevator, warehouse and office, to Hydro Constr. Co., Stock Exch. Bldg. General contractor awards contract for structural steel, to Ernst Iron Wks., 75 Lathrop St. Est. $150,000. Noted May 11, C. D.

N. Y., Buffalo—SERVICE STATION—Sears Roebuck & Co., 1905 Main St., general contract service station, Main St. and Jefferson Ave., to Crooker, Carpenter & Skaer, Inc., 120 Hardwood Pl.•••structural steel, to A. Feine & Sons Co., 140 Terrace St.•••reinforcing steel, to Klaman Steel Co., 1215 Hamburg Turnpike, Lackawanna•••plumbing and heating, to Batt Co., 955 Michigan Ave.•••electrical work, to Robertson Electric Co., 1263 Elmwood Ave.••• roofing, to J. A. Sanders, Inc., 107 Lathrop St. •••painting, to Doyle Co., Jackson Bldg., Buffalo. Owners will purchase tanks and equipment.

N. Y., New York—COKE HANDLING PLANT —Consolidated Edison Co., 4 Irving Pl., constructing coke handling plant, 427 East 110th St., separate contracts. Est. about $37,000. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

N. Y., New York—GARAGE, etc.—Consolidated Edison Co., 4 Irving Pl., constructing 1 story, garage, 211 West 65th St., to Paul & Murphy, 448 6th Ave. Est. $37,000. Contractor awarded separate contracts. Noted May 11, C.D.—May 14, E.N.-R.

N. Y., New York—WAREHOUSE, etc.—John Morrell & Co., 77 Kent St., Brooklyn, 4 story, white Bedford stone warehouse, storage building 446-448 West 14th St., to Turner Constr. Co., 420 Lexington Ave., $200,000. H. P. Henschien, 59 East Van Buren St., Chicago, Ill., archt. New York Dressed Beef Poultry Terminal, Inc., c/o owner, lessee.

N. Y., Syracuse—FACTORY—F. E. Young, general contractor, 415 Euclid Ave., masonry work, 2 story, 61x100 ft. factory, Gifford St., for Syracuse Electrotyping Corp., 122 Dickinson St., to Matt Sinesi, 209 Orlando Ave. H. D. Phoenix, 413 Seitz Bldg., archt.

N. C., Charlotte—PLANT—American Oil Co., constructing bulk oil storage plant, incl. tanks, steel metal warehouse, garage and office, to Southeastern Constr. Co., 218 West 2nd St., Charlotte.

N. C., Greensboro — PLANT — Mock-Judson-Voehringer Co., mill addition, to G. W. Kane, Greensboro, $54,989. Bids Apr. 14. Noted May 1, C. D.—Apr. 9, E. N.-R.

N. C., Statesville—PLANT—Duchess Fabrics Corp., 1 story, 50x80 ft. plant addition, textile equipment and group dwellings for workers of village, separate contracts being awarded.

O., Cleveland—PLANT—Clark Controller Co., 1146 East 152nd St., constructing plant addition, to J. L. Hunting Co., 9th Chester Bldg. Est. $38,000. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

O., Cleveland—PLANT—Thornton Sheet Metal Co., 3441 East 76th St., plant on Morgan Ave., to Gillmore Carmichael & Olson, 1873 East 55th St. Est. $37,000 with equipment. Noted Apr. 29, C. D.—May 7, E. N.-R.

O., Marshalltown—PLANT—Fisher Governor Co., constructing plant addition, to H. E. Reimer Co., Marshalltown. Est. $37,000 with equipment. Private plans.

Pa., Warren—BARREL HOUSE, etc.—Conewango Refining Co., T. Moore, purch. agt., Market St., constructing 4 story, 50x110 ft., concrete, cinder block and iron barrel house at crude refinery plant, separate contracts awarded. Owner purchases materials and equipment. Est. $40,000. A. Gohn, c/o owner, ch. engr.

★ **S. C., Charleston**—PAPER MILL—West Virginia Pulp & Paper Co., 230 Park Ave., New York, paper mill, to Morton C. Tuttle Co., 31 St. James Ave., Boston, Mass. Est. $5,000,000. Private plans.

Utah, Salt Lake City—LABORATORY—Sound Research Laboratories, Inc., 753 South 7th St. East, Salt Lake City, constructing laboratory, to Jacobsen Constr. Co., 724 South 3rd St. East, about $47,600. E. Piers, Ogden, archt.

Wis., Milwaukee—GRAIN ELEVATORS—D. D. Weschler & Son Co., 4295 West Burnham St., wrecking old elevators and constructing 50x50-100 ft. new grain elevators, rein.-con., plain found., on South 43rd St., to McDonald Eng. Co., Chicago, Ill. Est. $75,000. G. Loeble, Chicago, Ill., archt.

Wis., Waukesha—PRINTING PLANT—Freeman News, 259 South St., 2 story, basement, 41x114 ft. printing plant, to Pfeiffer Constr. Co., 1530 South 74th St., West Allis. J. P. Bruecker, 1581 North Prospect Ave., Milwaukee, archt. Noted Apr. 20, C. D.—Apr. 23, E. N.-R.

Man., Winnipeg — PLANT — Canada Malting Co., 544 Grain Exchange Bldg., steel in connection with 400,000 bu. annex to elevators, to Dominion Bridge Co., 702 Canada Bldg. Noted May 14, C. D.—May 21, E. N.-R.

Ont., Essex—FACTORY—Gonelin Constr. Co., general contractors, 18 Felix Ave., Sandwich, painting 1 story, 60x105 ft. production building, 53x105 ft. receiving platform and separate power house, Talbot St., for Empire Foods Corp. Ltd., 159 Bay St., Toronto, to National Painting & Decorating Co. Ltd., 171 Wyandotte St. E., Windsor. Noted May 12, C. D.—May 14, E. N.-R., under "Contracts Awarded."

Ont., Toronto—FACTORY—Pattens & Baldwins, 1000 Roselawn Ave., York Twp., constructing 2 story, 180x300 ft., rein.-con. top addition, to J. Wilde & Co. Ltd., 711 C. P. R. Bldg. Est. $149,000.

★ **Que., Comeau Bay**—PAPER MILLS—Ontario Paper Co., 485 McGill St., Montreal, 5,000 tons or more steel and steel erecting, for paper mill, to Dominion Bridge Co., Montreal; two 262 in. newsprint units for plant, to Dominion Eng. Co. Ltd., Montreal, about $2,000,000. Total est. about $8,000,000. Noted Apr. 23, C. D.—Apr. 30, E. N.-R., under "Contracts Awarded."